

126053

JPRS-CST-87-009

10 MARCH 1987

China Report

SCIENCE AND TECHNOLOGY

19981120209



FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA. 22161

3
114
A06

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-CST-87-009

10 MARCH 1987

CHINA REPORT
SCIENCE AND TECHNOLOGY

CONTENTS

PEOPLE'S REPUBLIC OF CHINA

NATIONAL DEVELOPMENTS

Sino-American S&T Training Center Success Noted (Chen Xinggui, Sun Maode; RENMIN RIBAO, 28 Nov 86).....	1
Survey on Women's Status in Science Positions (RENMIN RIBAO, 28 Nov 86).....	4
Spark Plan Progress Reported (Chen Zujia; RENMIN RIBAO, 29 Oct 86).....	6
Science Research Funding Cutbacks Discussed (Zhang Yingwu; RENMIN RIBAO, 29 Nov 86).....	9
Military Enterprise's Success in Civilian Goods Production (Wan Yijun; HUBEI RIBAO, 19 Oct 86).....	13
Technology Export Problems, Solutions Discussed (Feng Xuefeng; WEN HUI BAO, 7 Nov 86).....	14
New Group Begins Technology Market Activities (JISHU SHICHANG BAO, 14 Oct 86).....	16
Group Formed To Guide Technology Market Efforts (Xu Jiuwu; GUANGMING RIBAO, 7 Oct 86).....	18

Beijing Plans for High Tech Development Announced (Bie Qinghe; BEIJING KEJI BAO, 10 Oct 86).....	20
Development Research in Institutions of Higher Learning (Xie Longxiang; KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT], No 4, Oct 86).....	22
Assessment of Semiconductor Facilities, Development Plans (Shen Jansen; DIANZI YU ZIDONGHUA [ELECTRONICS AND AUTOMATION], No 1, 20 Feb 86).....	31
Fund Created To Subsidize Young Scientists (Wang Yougong; RENMIN RIBAO OVERSEAS EDITION, 24 Oct 86). .	41
CAS Effort To Foster Young Scientists Reported (RENMIN RIBAO, 8 Nov 86).....	43
Locally-Administered Institute Discussed (Bie Qinghe; BEIJING KEJIBAO, 12 Nov 86).....	45
Xian Jiaotong University Graduate Program Described (Jiao Yanyuan; SHAANXI RIBAO, 22 Nov 86).....	47
Patent Office Director Discusses Patent Procedure (Huang Kunyi; ZHONGGUO ZHUANLI [PATENT REVIEW OF CHINA], No 10, Oct 86).....	48
Patent Considerations in Science Management Work Reported (Hao Meifang; BEIJING KEJIBAO, 1 Oct 86).....	53
Technology Patent Situation Described (Li Dejin; RENMIN RIBAO OVERSEAS EDITION, 8 Nov 86).....	55
Advances in Chinese Aircraft Production Noted (Gao Xiaoxing; RENMIN RIBAO OVERSEAS EDITION, 5 Nov 86)..	57
Jiangsu, Ministry of Astronautics Cooperation Reported (Hua Yaolin; XINHUA RIBAO, 23 Oct 86).....	59
Fujian Science Association Convention Reported (FUJIAN RIBAO, 2 Nov 86).....	61
Guizhou Karst Studies Reported (Yang Xiling; RENMIN RIBAO OVERSEAS EDITION, 27 Nov 86)..	65
Scientific Research, Production Cooperation in Hebei Discussed (Liu Xibo; KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT], No 4, Oct 86).....	66

Large Technology Market Opens in Shijiazhuang (Xue Luying; HEBEI RIBAO, 15 Oct 86).....	74
Shenyang Area Technology Development Plan Announced (JISHU SHICHANG BAO, 2 Sep 86).....	76
S&T Restructuring Effects in Zhejiang Described (ZHEJIANG RIBAO, 30 Oct 86).....	78
PHYSICAL SCIENCES	
Analysis of Adhesive Lap Joint (Zhang Fufan; YINGYONG SHUXUE HE LIXUE [APPLIED MATHEMATICS AND MECHANICS], No 10, Oct 86).....	80
On Surface Instability of Elastic Half Spaces (Cao Guangzhong; YINGYONG SHUXUE HE LIXUE [APPLIED MATHEMATICS AND MECHANICS], No 10, Oct 86).....	81
APPLIED SCIENCES	
Perturbation Theory of Multiple Standard Addition Method in Ion-Selective Electrode Potentiometry (Wang Jirong, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	82
CIAC-Carbon-13 NMR Search System (Xu Lu, Li Guoquan, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	83
Preparation of Polar Glass Support Coated Open Tubular Columns (Wang Guojun, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	84
Determination of Trace Cyanide in Water by Fiber Optics Fluorometry (Zhang Zhujun, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	84
Determination of Micro Amounts of Gold (III) by Cathodic Stripping Voltammetry (Zhang Chunxu, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	85
Kinetic Spectrophotometric Determination of Manganese (II) in Polluted Waters (Wang Zunben, et al.; FENXI HUAXUE [ANALYTICAL CHEMISTRY], No 6, 20 Jun 86).....	86

Nonelectrolyte Vapor-Liquid Equilibrium Data Base (Wang Luoshan, et al.; HUAXUE TONGBAO [CHEMISTRY], No 6, 18 Jun 86).....	87
Synthesis of Rare Earth-Iron-Cobalt Quaternary Oxides, Their Thermosensitivity (Li Zhuotang; YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS], No 6, Dec 85).....	88
Electric Properties of InP, $In_{1-x}Ga_xAs_yP_{1-y}$ (Meng Xianzhang, Yao Xin; YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS], No 6, Dec 85).....	89
Development of Covar Strip Cold-Clad With Ag-Cu Welding Filler Metal (Tao Zhigang; YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS], No 6, Dec 85).....	91
Chromate Spinels: A Humidity-Sensitive Ceramic Material (Yu Shuchang, Sun Daqian; YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS], No 6, Dec 85).....	92
Double-Shielded Aspirated Thermocouple Sensor (Zhang Zhongting; YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS], No 6, Dec 85).....	94
Synthesis of Organic Titanium Compounds (Ma Yongyang, Hou Xue; LANZHOU DAXUE XUEBAO [ZIRAN KEXUE BAN] [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCE EDITION)], No 2, 28 Jun 86).....	95
Computer Processing of Gel Permeation Chromatography Data (Hua Lei, Tao Huifen; HUAXUE SHIJIE [CHEMICAL WORLD], No 9, 25 Sep 86).....	97
Computer Analysis of Electronystagmogram Signals, Its Clinical Applications (Xu Shihui, et al.; ZHONGHUA ERBIYANHOUKE ZAZHI [CHINESE JOURNAL OF OTORHINOLARYNGOLOGY], No 2, 10 Jun 86).....	98
LIFE SCIENCES	
Study on Microwave Sterilization Medium (Zhao Wenbin, et al.; WEISHENGWUXUE TONGBAO [MICROBIOLOGY], No 4, Aug 86).....	100
Simple Periodate Method for Horseradish-Peroxidase-Labeled Staphylococcal Protein A (Zhou Huiwen, et al.; WEISHENGWUXUE TONGBAO [MICROBIOLOGY], No 4, Aug 86).....	101

Microchemical Method for Determining Hemaporphyrin Derivatives in Blood (Xiang Wenyu, et al.; YAOXUE TONGBAO [CHINESE PHARMACEUTICAL BULLETIN], No 7, 8 Jul 86).....	102
Erythrocyte Membrane Protein, ATP Enzyme in One Case of Hereditary Hypercytosis of Fusiform Cells (Li Jianxin, et al.; ZHONGHUA XUEYEXUE ZAZHI [CHINESE JOURNAL OF HEMATOLOGY], No 7, 30 Jun 86).....	103
Spontaneous Suppressor T Cell Function and Its Relationship With T Cell Subsets in Hepatitis B (Liu Feng, et al.; ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA], No 9, 15 Sep 86).....	104
Study of Suppressor T Cell Function and T Cell Autologous Hepatotoxicity in CAH-B (Xie Xianchun, et al.; ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA], No 9, 15 Sep 86).....	105
Study of Intrahepatic Viral DNA in 98 Patients With Viral Hepatitis B (Wen Yumei, et al.; ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA], No 9, 15 Sep 86).....	106
Oral Administration of Branched Chain Amino Acid in Treatment of Hepatic Disease (Qian Shaocheng, et al.; ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA], No 9, 15 Sep 86).....	107

/12223

NATIONAL DEVELOPMENTS

SINO-AMERICAN S&T TRAINING CENTER SUCCESS NOTED

Beijing RENMIN RIBAO in Chinese 28 Nov 86 p 3

[Report by Chen Xinggui [7115 5281 6311] and Sun Maode [1327 2021 1795]: "Studying Abroad Without Leaving the Country"]

[Excerpts] To the east of the Dalian College of Engineering Administration Building, there is a newly constructed 5-story building that is not particularly remarkable. Consequently, this marble signboard inlaid with the inscription: "The Dalian Training Center for Chinese Industrial Science and Technology Management" in both Chinese and English certainly attracts people's attention.

This center was jointly sponsored 6 years ago in accordance with the terms of a Sino-U.S. science and technology cooperation agreement and has been the subject of interest for both Chinese and American leaders. Here, a significant attempt is being made to allow "study abroad without leaving the country."

The Dalian Training Center director, Pang Dianying [1690 3013 5391], explained to us that over the last 6 years, this center has held 7-term classes for factory director and manager study groups and graduate classes, where the first term is a research group for economic leading cadre and the third term is a specialty topic in economics management. More than 1,000 enterprise management cadre have been trained and are scattered throughout the country, with the exceptions of Tibet, Qinghai, and Taiwan. Based on need, in 1984 the Training Center and the American State University of New York, Buffalo jointly ran a management class for masters students.

The graduate classes here are taught solely in English. The teaching materials, the curriculum, the methods of teaching, and the examinations of graduate students are all the same as for graduate students in the College of Management, SUNY Buffalo. The demands are strict. A warning is issued with 2 C's, and diplomas are only granted if all grades are good or better. Elimination here is completely impartial, so students must make great efforts and cannot be slack. The key to running this school is the teachers. Teachers who come here to lecture are largely professors with reputations in the United States--well known personages of all specialties and business circles. All together, more than 130 people have come here to teach.

Professors and specialists who have come here to teach have wide ranging connections with American business circles and have an abundance of experience and knowledge in regard to business management. They bring along with them from the United States new writings and information, new methods and means.

Graduate students here who are currently studying for the SUNY Buffalo masters in management are all young people who have worked a minimum of 3 years since graduation in their fields. The majority are science and engineering majors, for the most part 30 years old or less. They are fairly conversant with the management situations currently in enterprises and they have a perceptive knowledge in the area of enterprise management. They are dynamic and sharp. As they are studying, they come up with many questions regarding enterprise management. As they talk together, they are quite approving of this "studying abroad without leaving the country," and offer the following opinions:

"First of all, it saves money. Pursuit of a masters in management here is only half the cost of doing it in the United States."

"With this many classmates all together, there can be discussions when anyone wants to, and the Chinese teachers at the Training Center can give us supplementary instruction as we need it, so we believe that the results of our studies are more solid than if we had gone alone to the United States."

"Studying abroad can only be the experience and understanding of an individual, and is therefore somewhat restricted. It is not like here, where there is a collecting together of the knowledge of everyone to absorb things from abroad."

"But the best advantage to studying here is that we are not separated for any time from the real situation in this country. For things such as the penetration of economic reforms in this country, the problems encountered, and government policies, etc., we can promptly understand them and pay attention to them; as we study advanced experiences of others we can then think of how to resolve our own problems. No matter how rapid information from abroad is, in this point there is no way it can compare with being here."

They do want to go to the United States for a period so that on the basis of this ideal knowledge of modern enterprises and their management they can add some actual experience, conclude their studies, and bring their studies up to standard.

This Training Center has not just trained a group of management cadre, but has trained a group of key teachers. For example, the curriculum of 80 percent of the masters students has been offered to young and middle-aged teachers in this country. Not only that, but on the basis of thorough study, their absorption of American industrial science and technology management theory, methods, and means, with maintenance of self-focus, broad adoption of the many advantages, a blending and refining, and learning how to manage science to suit the reality in this country, they have made pleasing progress. Also, the newest experiences and writings in the areas of American management can be quickly transmitted to all areas of this country through the Dalian Training

Center. The Dalian Training Center has acted as an information center for management science, and has had a far-reaching effect on management cadre training classes everywhere in this country and on the nearly 100 colleges and departments of management in this country.

12586

CSO: 4008/2028

NATIONAL DEVELOPMENTS

SURVEY ON WOMEN'S STATUS IN SCIENCE POSITIONS

Beijing RENMIN RIBAO in Chinese 28 Nov 86 p 3

[Text] More than 5,000 female scientists and technicians made an appeal in a survey that we should change the unreasonable situation in responsible departments and in scientific and technical circles where women are not taken seriously.

In the spring of 1986, the Sichuan provincial science association, the provincial Women's Federation, and the provincial Academy of Social Sciences undertook a sampling survey of female scientists and technicians. The objects of the survey were female medical personnel and female agricultural sciences personnel at mid levels and higher. In all, 9,000 survey forms were sent out, 5,778 of which were finally returned and tabulated in the data statistics. The results of the survey showed that in the four modernizations female scientists and technicians have played active roles and have made many contributions, but that the function of a significant portion of female scientists and technicians had yet to be fully realized. Their positions are lower than those of men, and there is discrimination against them in areas such as promotion, adjustment of wages, and post evaluations.

Among female scientists and technicians, 15.62 percent feel that they have been able to make the most of their roles, 43.4 percent feel that they have only been able to exercise a portion of their potential, and 24.84 percent even feel that they "have a hard time developing their work," "have been actively inhibited," or "have nothing to do." Regarding the reasons their enthusiasm has not been fully utilized, first among those was that their "work could not receive a correct evaluation."

This situation regarding the underestimation of female scientists and technicians and the inequality between women and men is quite widespread. In the column "the attitude of your unit leaders toward female scientists and technicians," 57.6 percent filled in "stays at a respectful distance," "plays a minor role," and "underestimate female scientists and technicians." One comrade from the provincial Tea-Leaf Institute enclosed a note with her form, which said that the former secretary had said in front of a political study group of cadre from throughout the institute, "I respect men over women." The survey also revealed that fewer women have been elected into the ranks of leading groups. In responding to the item "the proportion of female

scientists and technicians in leading groups," on 43.3 percent of survey forms was written "there are none," and 29.8 percent of the people responded that the proportion of female scientists and technicians in leading groups is 10 percent or less. This situation is quite apparent in the agricultural system, where 56.2 percent of leading groups at all levels have no female scientists and technicians. One-half of scientists and technicians in the provincial Institute of Aquatic Produce are women, but there is none among the leading groups. This preference for men is also evident in post evaluations. At the Naxi County Office of Agriculture and Animal Husbandry, of 8 female college or vocational school graduates who graduated from 1959 through 1969, not one has been approved for a middle level technical position, while for the most part all of the males of the same period have been so approved. In some units, female scientists and technicians have more outstanding records than their male counterparts, but the males are promoted over the females. When male and female scientists and technicians obtain scientific and technical achievements of equal distinction, the males may be promoted one level in wages, but the females are not. In the allocation of housing, males, too, are dominant, as it is allocated to males but not to females. Female scientists and technicians have responded that open opposition to male-female equality is not often seen, but in fact male-female inequality is quite widespread.

The strain of household chores is a headache shared by all female scientists and technicians. For some 47.8 percent, the time they use each day for household chores can reach 3 hours and more, while for 47 percent that time is from 1 to 3 hours. 95 percent of them have the responsibility for caring for parents and for children. There are elderly above them, the young below them, and heavy burdens, to which is added a deficiency in economic conditions and an excessive share of household chores that has caused their states of health to become progressively worse, and has restricted their development and improvement in their vocations.

Female scientists and technicians urgently need a renewal of knowledge. They responded that their study time has been less, they have had difficulty in participating in advanced studies, and only 5 percent of unit leaders have supported their participation in scholastic activities, the majority never having taken an interest. The women are worried that they will not be able to renew their knowledge, that their vocational abilities cannot be improved, and that if this goes on for long there will be instability in their vocations, with the possibilities that they will be replaced. They are making an appeal for respect in the utilization of female scientists and technicians, for more attention to be paid to their training, and for opportunities for learning, for advanced studies, and for the renewal of their knowledge.

12586
CSO: 4008/2028

NATIONAL DEVELOPMENTS

SPARK PLAN PROGRESS REPORTED

Beijing RENMIN RIBAO in Chinese 29 Oct 86 p 3

[Report by Chen Zujia [7115 4371 3946]: "After Nearly a Year 'Spark Plans' Progress Smoothly"]

[Text] Materials from the State Science and Technology Commission show that the trend this year in implementation of the "spark plans" has been excellent and that progress is smooth. Science and technology "spark plans" have begun to function in vitalizing local economies.

The "spark plans" approved by the State Council are intended to use complete sets of advanced, suitable technology as "spark plans" in small to middle-size enterprises, and especially in town and township enterprises. It is also to be sent into the countryside to constitute a widespread fuel for the invigoration of local economies. Central leaders have made a high evaluation of this, considering that "if kept up for a long time, they are certain to have unimaginable consequences."

According to the "spark plans," there will be 3 chief aims during the seventh 5-year plan: to develop 100 sets of technologies and equipment suitable to the town and township enterprises and also for the arrangement of large scale production; to establish 500 technical model enterprises to provide a complete set of techniques and technologies, management programs, product designs, and methods for quality control for those town and township enterprises; to train 1 million rural intellectual youth and base level cadre, allowing them to master one or two advanced technologies suitable to their locality.

Over the last year, government at all levels has warmly supported the implementation of the "spark plans," and the numerous town and township enterprises and the broad countryside have seen them as "sending charcoal to those in snow," and have warmly welcomed them. By the end of August, 4,018 projects had been implemented. They are divided into the following fields: new forms of feed businesses and the storage and shipment of those products, their preservation and technologies for processing in the area of production; technologies for the comprehensive utilization of agricultural, forest, and local produce; rural and township construction and the development of building materials, and factory-made and commercialization technologies for the construction of rural housing; small-scale extraction and selection of mineral

products and preliminary processing, and the technology for the production of products; the dissemination and application of new technologies and new materials; products complementary to large industrial production; regional integration and development; export of commodities; the technological development of small scale production equipment and training of personnel.

"Spark plan" projects that have already been implemented have fully exhibited the characteristics of "short-term, appropriate, and quick," and with the integration of existing scientific and technical achievements and mature technologies with the natural resources of an area, with a little more development these can gain outstanding economic results in the near future. Among the more than 4,000 projects that have been implemented, 70 percent have already made achievements at some stage, and some are even complete and generating an income or are nearly complete. In only half a year, a Heilongjiang Mudanjiang textile raw materials plant set up a production line, used the leftover bits and pieces from flax to manufacture an exquisitely wrought hemp, with annual production of 250 tons, quality nearing that of England, and it is already in production. The Institute for Special Aquatic Produce in Hanshou, Hunan has the technology for artificial propagation and raising of soft-shelled turtles, bullfrogs, turtles, etc., which has been disseminated to 24 provinces, cities, and regions, such as Beijing, Guangdong, Fujian, Gansu, and Heilongjiang. A biochemistry plant in Rudong County, Guangdong, has taken on a project to use monosodium glutamate run-off to extract unicellular protein. In only 7 months they completed the project obligations of technique restructuring and equipment development and installation. This is a unique technique in this country that both resolves the problem of environmental pollution by the monosodium glutamate run-off, but also makes something valuable out of the waste, opening new channels for waste processing in monosodium plants.

Personnel training efforts in all areas have begun to unfold, greatly exceeding originally determined planning. By the end of July, 29 provinces, municipalities, and autonomous regions, together with 7 single-item planned cities, have begun the training of 1.05 million people, 5 times that of the original plan. In Jiangsu alone, 150,000 people have been trained.

Funding for implementation of the "spark plans" has largely come from the local areas. Investment already this year has been 2.26 billion yuan, within which allocation by the central authorities has been only 60 million yuan, bank loans have been 300 million yuan, and the rest has been funds put up by each area. It is forecast that these projects will be completed within 2 or 3 years, that output values can be increased by more than 10 billion yuan, and that what goes into production will be a ratio of 5:1 over that recently.

That the "spark plans" have progressed smoothly, aside from the facts that the plans themselves have been suited to our national situation and have been the concern of many and that leaders at all levels have broadly respected them and have led them adroitly, the close integration of every sector and aspect of society and their great efforts at coordination has been an important factor. The majority of provincial, municipal, and regional science and technology commissions, planning commissions, economics commissions, agricultural commissions, town and township enterprise offices, science and technology

cadre offices, and democratic parties have all been able to break through sector boundaries to develop lateral associations. Many science and technology units and high level academies and institutions have actively gotten involved in the countryside, and have selected science research topics to promote the implementation of the "spark plans."

Internationally, the "spark plans" have attracted a great deal of attention. Twelve nations and organizations, such as those in Eastern and Western Europe, the World Bank, and the United Nations funding systems, have proposed promoting "spark plans" together with us.

12586
CSO: 4008/2018

NATIONAL DEVELOPMENTS

SCIENCE RESEARCH FUNDING CUTBACKS DISCUSSED

Beijing RENMIN RIBAO in Chinese 29 Nov 86 p 3

[Article by Zhang Yingwu [1728 2019 0710]: "'Labor Pains' that Are Fully Desired"]

[Text] This year, the restructuring of the operating expense allocation system for science research has formally begun throughout the country. During the months of September and October this writer went to 13 science research units in the provinces of Shaanxi, Gansu, Qinghai, and Sichuan that concentrate on technology development. Most of them are experimental units for which operating expenses were reduced either last year or the year before, 10-50 percent, and at one unit they were completely terminated.

In talking about conditions as operating funds were being cut, responsible persons in several research units used the phrase "labor pains" without knowing that others did also. They said that at first the pressure was tremendous, but they got through by clenching their teeth and now feel quite happy, much like the feelings before and after childbirth. We can get through this restructuring of the science research operating funds allocation system, but it is a struggle!

Five Major Changes After Cutting Operating Expenses

One is that people's thinking changes. In the past, science research units ate "royal grains," where whether the tasking passed on from above was done well or not would not affect anyone's existence, for which there was no concern. We have now begun to cut operating funds, which will be completed sometime within the next few years. Who would not feel pressured? From the academy or institute director down to the laboratory head, project group leader, or ordinary research person, all have begun to plan for the existence of the unit. In the past, scientists and technicians either disdained or were ashamed to discuss money, what was called haggling over every penny and the scholars disgrace. Now, there is no one who does not pay attention to the accounts sheets. In the past when an evaluation was made of the record and contributions of a researcher, most important were his papers and the number of achievements, and consequently there was a stubborn respect for shutting up behind closed doors and studying; now, they want to see whether your achievements are usable, whether they can quickly be turned into production forces, and whether they can bring in economic result.

Second, since there have been changes in the methods of operations management, there has been a change from a closed model to an open one. Ao Qiang [2407 1730], director of the Sichuan Province Computer Applications Research Center, said as he pointed to several empty rooms within the unit, that the research personnel there had all left, as near as town and township enterprises in the counties, and as far as away from this province, while in the next room were many countryfolk who had been sent from the counties to undergo training there. Will not this kind of environment and way of working affect science research? He laughed and said, "This unit of ours has more than 200 people and our funding was cut off completely last year. But we have put out 47 achievements for a net income of 310,000 yuan, which would have been unthinkable in the past." The majority of units have established departments that exclusively manage lateral relations, some of which are called professional divisions, some development sections, and some departments for dissemination and applications. These kinds of departments are the busiest at this time. Within the science research units, they have properly left the "common rice bowl," and through contracts and position responsibility systems have brought tasking to particular people, where the quality of the performance of that tasking directly affects individual incomes. Some units have simply formulated targets for economic income. As for example the Chengdu City Chemical Engineering Research and Design Institute annual quotas for the academy are: high level engineers, 3,500 yuan, engineers, 3,000 yuan, assistant engineers, 2,500 yuan, and technicians, 1,800 yuan. While this method is open to question, it has proved effective in promoting lateral associations and in arousing the enthusiasm of research personnel.

Third, there have changes in economic conditions. All units have unhesitatingly acknowledged that their laterally derived incomes have exceeded the amounts that have been cut from operating funding. Four units, namely, the Shaanxi Province Institute of Chemical Engineering, the Qinghai Province Institute of Light Industry, the Sichuan Province Computer Applications Research Center, and the Sichuan Province Foodstuff Fermentation Industrial Research and Design Institute over the past 2 years have built dormitory buildings or office buildings, some have even purchased equipment and instruments, the money for which has either partially or completely come from lateral income. Individual income for research personnel has also been universally raised.

Fourth, there have been changes in the knowledge structures of research personnel. After research units were opened up, they were faced with a wide variety of technical difficulties, and no one's specialized knowledge was enough to completely satisfy the demands. The majority of people in the Sichuan Province Institute of Agricultural Machinery had studied agricultural machinery exclusively, and over the past 2 years they have helped several counties with the development of technology for extensive processing of agricultural by-products such as with grain, fruit, silkworms, hogs, cotton flax, and tea-leaves. The secret of their success was to escape from the confines of the so-called "orthodox" to where something could be done for any problem and whatever they became involved with could be learned.

Fifth, there have been changes in relations between people. Those who were academy or institute directors in the past had to put a great deal of their energies into revamping and defending relations with responsible departments. If others have jurisdiction over your firewood, rice, oil, and salt, wouldn't you be protective? As units can organize a certain portion of their incomes now, the backbones have stiffened. Within the units, there have been more opportunities for scientists and technicians to put their talents to good use, there have been fewer instances for complaining of prejudice and the harboring of talent, and there is less market for jealousy and envy.

There Have Been Experiences Difficult To Recall

When science research unit responsible persons speak of problems and difficulties facing them, speech comes flowingly, and some of it is quite moving.

One thing is that policies are not complementary, most noticeable of which are when tax revenue and bonus policies are not complementary. At tax time you are treated as an enterprise, you work as hard as you can to bring in an income, but then after taxes you are cleaned out. The amounts that have been cut from operating funding are not in keeping with bonuses, which is apparent in an inability to encourage a spirit of reform.

Another thing is that some leadership organizations cannot only act as reserves in the reform of science research units, but they are more of a hindrance than a help. Among the responsible persons from science research units seen on this trip, four have been under investigation for a long part of the past 2 years, and for some their cases have still not been settled.

A third thing is the prices of materials have risen and there are more days of apportionment, all of which squeeze the operating funding even tighter. Taking apportionment as an example, when children go to school money needs to be paid, money is needed for fixing bridges and paving roads, public health needs money, and money is even needed for things like celebrating on holidays. The more income you have, the tighter are the demands. Recently, there have been cases where high level organizations have been taking advantage at the expense of others.

Listening to Different Voices

Among those voices praising the decisions already made regarding the cutting of operating funds for science research units, there are also some different sounds, some of them quite bitter.

Some people are concerned that the proportion of income from the transfer of rights to technology is too small in comparison with current lateral income, and is that not failing to attend to proper business? Some people are worried that if the majority of research personnel put their energies into technology that suits production, if this goes on for some time will we be able to maintain the reserves for science research?

By listening to different voices we can clear our heads and promptly look into certain abuses that might arise in the process of implementing decisions made so that we might find new, even better means of resolution. Having run into these responsible persons in science research units, this writer has even more turned to the view that when the proportion of income from transfer of rights to technology is small, that shows that our industrial and agricultural production is backward. If we do not use science and technology as quickly as possible to transform the backward state of our production, the achievements of science and technology will only be shelved and neglected, and what then would the significance be for our scientific and technical efforts?

12586
CSO: 4008/2028

NATIONAL DEVELOPMENTS

MILITARY ENTERPRISE'S SUCCESS IN CIVILIAN GOODS PRODUCTION

Wuhan HUBEI RIBAO in Chinese 19 Oct 86 p 2

[Report by Wan Yijun [8001 4135 6874]: "There Are No Opportunities for Military-Industrial Enterprises that Do Not Get Involved with Civilian Goods"]

[Text] Due to a restructuring of its product structures, state operated factory No 404 that had accumulated many losses last year finally began to rise from the bottom to join the ranks of the profit makers. From January through August, its results improved again over those of the same time last year. This change for the factory proves once again that there are no opportunities for military-industrial enterprises that do not get involved with civilian goods.

This factory was formerly a military-industrial enterprise that for various reasons had lost millions of yuan by the end of 1984. Early last year, the factory party committee mobilized the masses, and by making the most of the advantages of a solid technical strength and advanced equipment, carried out a restructuring of their product mix. They developed new types of products in building materials and cement machinery, plastics machinery, textile machinery, and pressure vessels.

There were new difficulties from the beginning of this year through April. With electric power in short supply, the workers proposed the slogan "there is a morning shift, there is an evening shift, so let's create another shift by squeezing in the time" until this problem was seen through; when materials were in short supply, comrades in the supply divisions worked out ways to resolve this. At the same time, on the one hand they established economic relations with science research departments, with higher institutions, and with state-run enterprises or town and township enterprises in nine provinces and cities, such as Sichuan, Gansu, Zhejiang, Hunan, and Hebei, and also sent out a marketing brigade to be active outside the factory. On the other hand, they wrote papers regarding the strengthening of enterprise management. By the end of August, the gross industrial output value and sales of commodities for the whole factory when compared with the same period last year had risen 70.9 percent and 42.53 percent, respectively. They realized a profit of 300,000 yuan, where last year at the same time they had lost 370,000 yuan.

12586
CSO: 4008/2019

NATIONAL DEVELOPMENTS

TECHNOLOGY EXPORT PROBLEMS, SOLUTIONS DISCUSSED

Shanghai WEN HUI BAO in Chinese 7 Nov 86 p 1

[Report by Feng Xuefeng [7458 1331 6912]: "How Will Our Technical Commodities Go Out to the World?"]

[Text] "How are we going to get our technical commodities out into the world faster?" This was the most common question heard during discussions among representatives of the technical trade delegation at the recently concluded Guangzhou Export Commodities Fair. After many discussions, they made three recommendations: as quickly as possible train a group of technology export agents; hardware and software should be exported as complete sets; set up marketing networks in a reasonable manner abroad.

The greatest volume of technical trade at this Guangzhou Export Commodities Fair was the export of the KTP laser crystal from Shandong University. In the beginning, the price offered by the foreign firm was rather low, and Jiang Minghua [5592 2494 5478], negotiations representative from our side and professor at Shandong University, then brought out some reports brought back from American scholastic exchanges, evaluation materials from the same industry in the United States, and evaluations of a comparison of features between the Chinese and American products as undertaken by Hamburg University in West Germany. He explained in detail the state of development of crystal technology abroad and the pricing levels of the international market, at which time the foreign firm was completely convinced and the transaction was carried out at the higher price. But not all negotiations involving a technical export item can have a specialist in charge, and for some of the technical products brought by the Guangzhou Fair technical trade delegation discussions with foreign firms could not even progress further because there was no one who was familiar with the technical features. The technical trade delegation representatives made an appeal: we should train a group of technical export agents as quickly as possible.

It was also apparent in technical trade at the Fair that we do not have sufficient high technology key products for export, and the international market is not great; in fact, a large number of applications technologies had many customers. The specialists said that in general, this country is a technologically backward country and that we cannot make the export of high technology to first- and second-world countries the focus of technology

exports, but must instead make third-world countries our primary markets for our applied technology exports. If we are to allow technical commodities from this country to enter these markets, hardware and software must both be exported as complete packages. This means high technology project contracts that include equipment and technology.

In order to export technology, the specialists have recommended that we should set up technology dissemination networks in more third-world countries. Many comrades have recommended that before exporting technical items, we should publicize this fact in foreign newspapers and that invitations should be issued through these networks with this in mind. Only in this way can we promote Guangzhou Export Commodities Trade Fair technical transactions.

12586

CSO: 4008/2025

NATIONAL DEVELOPMENTS

NEW GROUP BEGINS TECHNOLOGY MARKET ACTIVITIES

Tianjin JISHU SHICHANG BAO in Chinese 14 Oct 86 p 1

[Text] The Joint Development Bloc for Chinese Technology Markets is a multi-discipline, trans-industrial, trans-system lateral association composed of units of the pertinent ministries and commissions of the central authorities that are responsible for the technology markets. It concentrates the strong technical forces of science research, education, and production sectors in our national economy. There is a galaxy of talent, knowledge is highly concentrated, technology is advanced, equipment is excellent, and there is abundant real power for development.

1. They contract for tasking such as major national science and technology problem solving, the importation of technology, and bidding for the new technology demonstration and dissemination projects.
2. They contract for regional projects in technical and economic development and the technical transformation of industries.
3. They actively develop science and technology to alleviate poverty and disseminate and transfer suitable technology to town and township enterprises.
4. They contract for tasking for both domestic and foreign enterprise and facility units and as commissioned by industry in the areas of relevant technology development, technical consulting, technical problem solving, the development of new products, foreign and domestic technical exchanges and exhibitions, technical service, and engineering projects.
5. They take on the tasking of the transfer of rights to technologies and patent certification trade for both foreign and domestic enterprise and facility units and for individuals.
6. Joint finance organizations provide preferential loans or investment to support the technology markets, to develop new technologies, and for the commercialization of technical achievements, so the Bloc provides information and technical credit guarantee services to those financial organizations.

7. They take on technology exporting, technology importing, and the absorption, assimilation, and associated tasks having to do with the importation of technology; they develop international technology trade, and establish relations and cooperation with technology trade organizations throughout the world.

8. They establish relations and cooperation with all provinces, autonomous regions, directly administered municipalities, and cities with province level economic decision making authority, as well as with prefectures, cities, and counties. They develop hierarchical, multi-channel, multi-format, and multi-content technology market activities.

9. They organize the complementary development of technologies between departments, industries, and regions.

10. They take up technical lectures and training both at home and abroad, as well as the dissemination of suitable technologies.

11. They contact and cooperate with relevant units both at home and abroad, and develop technology market information resources.

Business address: Beijing Municipality, Hai-Dian District, Taiping Road, A-18 South, 4th Floor.

Contact persons: Wang Qingyang [3769 3237 3152] and Luo Qin [5012 4440].

Phone: 81.3764 81.7531-376

12586

CSO: 4008/2028

NATIONAL DEVELOPMENTS

GROUP FORMED TO GUIDE TECHNOLOGY MARKET EFFORTS

Beijing GUANGMING RIBAO in Chinese 7 Oct 86 p 1

[Report by Xu Jiuwu [1776 0046 2976]: "United Development Group Formed for China Technology Markets"]

[Text] The Chinese Technology Market United Development Group was established 6 October in Beijing. State Council member and minister-in-charge of the State Science and Technology Commission, Song Jian feels that this is an important component of lateral association. He pointed out that whether the reforms of the Chinese economic and science and technology systems can be effective to a certain degree will depend upon the growth and prosperity of the technology markets. Comrades who are engaged in this work should make contributions in the spirit of dedication and development to promote the integration of technology and the economy in this country.

The Chinese Technology Market United Development Group is a multidiscipline, trans-industrial, trans-system lateral association composed of more than 40 units responsible for technology markets from pertinent departments and commissions of the central government. This development group concentrates strong technical capabilities for science research, education, and production sectors in our national economy, and has a great deal of real power. Its goals are to implement the "Resolution by the CPC Central Committee Regarding Restructuring of the Science and Technology System," carry out the strategic principles where "economic construction must depend upon science and technology, and science and technology must be oriented to economic construction," make the most of the advantages of lateral association, open up technology markets both home and abroad, make use of market mechanisms, promote technology advancement in all sectors and regions, and hasten the development of the national economy.

Assistant minister-in-charge of the State Science and Technology Commission and group leader of the Leading Group for National Market Coordination, Guo Shuyan [6753 2885 6056], said in a speech that the actual experience in the more than one year since implementation of the resolution by the Central Committee regarding restructuring of the science and technology commission has shown that the opening up of the technology markets have been not only important links and points of breakthrough for science and technology system reforms, but have also provided the requisite conditions for reform of other

aspects of the science and technology system. He pointed out that the party Central Committee and the State Council have already resolved that during the seventh 5-year plan there would be great effort to develop a commodity economy under the guidance of socialist planning, to establish the framework for a commodity economy, and to make technology markets that will be important components of socialist unified commodity markets. There is sure to be further prosperity for technology markets.

12586
CSO: 4008/2025

NATIONAL DEVELOPMENTS

BEIJING PLANS FOR HIGH TECH DEVELOPMENT ANNOUNCED

Beijing BEIJING KEJI BAO in Chinese 10 Oct 86 p 1

[Report by Bie Qinghe [0446 3237 3109]: "Beijing Will Soon Build More than 10 High Technology Laboratories"]

[Text] "Fully utilize the advantages and resources in Beijing. Select those fields in Beijing that have strong technological advantages and research powers, and stress preparations for the construction of a group of high technology laboratories to constitute a 'high technology Beijing contingent'." This was said by Comrade Lu Yucheng [7120 1342 3397] of the Beijing Municipal Standing Committee and the municipal science and technology commission on 4 October at a signing ceremony for the municipal high technology laboratories. He announced that within the coming half-year construction would begin on 10 to 15 high technology laboratories.

Comrade Lu Yucheng pointed out in his speech that the working policies for science and technology in Beijing Municipality have undergone major revisions, that is, that science and technology will go in two directions: it will cater to economic construction; it will cater to municipal construction and to municipal management.

Proceeding from this policy, Comrade Lu Yucheng feels that aside from the two levels of "spark plans" and "prominent foci, for which we concentrate our strength into taking control of a group of scientific and technical projects that will have a large effect on this city, or a particular system, or a particular sector, or a particular industry, and for which results will be more apparent," another very important level is to pay close attention to high technology. He said that "in some high technology fields, we will select a group of projects that are of a higher level of technology and that have clear characteristics and advantages, and provide them with major support to allow these projects to produce achievements in from 4 to 6 years. These would become industries or products during the eighth 5-year plan."

Comrade Lu Yucheng stressed that we should get involved with high technology the way that we have with the "spark plans." He feels that in the various aspects of industrial base, scientific and technical development, personnel training, municipal facilities, investment environment, information and advising, and market potential, these are all advantages and resources for the

development of high technology. This is to say that the conditions for developing high technology in Beijing are quite good, and from the point of view of economic "reserves," we should set up our own superiorities in the fields of high technology.

Regarding the building of high technology laboratories, Comrade Lu Yucheng proposed the particular advice that we should "choose the best locations and stay away from capital construction; we should be open, both within and to the outside, to attract talent in all aspects; should broadly implement a hiring system and responsibility for expenses, with rewards and fines, and pertinent responsible leaders should provide the necessary support." He said that "by supporting the development of these high technology laboratories, we will promote the transformation of traditional industries and the rapid development of rising new industries."

12586
CSO: 4008/2018

NATIONAL DEVELOPMENTS

DEVELOPMENT RESEARCH IN INSTITUTIONS OF HIGHER LEARNING

Beijing KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT] in Chinese No 4, Oct 86
pp 56-60, 52

[Article by Xie Longxiang [6200 7893 5046] of Xiangtan University: "On Development Research in Institutions of Higher Learning"]

[Text] Guided by the strategic principle that science and technology must serve economic construction and spurred by society's needs, institutions of higher learning are paying greater attention to development research. However, opinions still differ as to whether this kind of research should be promoted in universities and colleges, and relevant policies and measures are still lacking. The matter merits attention and dicussion.

I.

Some people hold that institutions of higher learning should concentrate on research in basic and applied sciences which contributes to teaching and learning, and that development research is only the popularization and application of scientific and technological achievements which may contribute to economic construction but not necesarily to the education and training of qualified people, and which may even hinder efforts to improve the academic standard and quality of education. Others maintain that development research is meant to know only how and not why and that in the long run it is bound to hamper development in science and technology. Still others feel that teachers who engage in development research are "motivated by money," ignore their proper duties," and so forth. These views are one-sided and detrimental to the sound growth of development research.

What is development research? In classifying scientific research, it is called "research serving economic development" by some and "experimental development" by others. The definitions it has at home and abroad are very similar, with minor variations. For the sake of convenience in discussion, we shall use the definition for "esperimental development" given in the "Guide to Statistical Scientific and Technological Data" compiled by UNESCO. Thus, development research is "any systematic creative activity using knowledge from basic and applied research and experiments to popularize new materials, products, designs, processes, and methods or to make major improvements on existing prototypes and pilot plants." It is obvious that this kind of research is different from basic

research, which endeavors to know the world with definite objectives. It is research which seeks to change the world with definite objectives.

Science and technology are a part of the productive forces, but they are latent, not direct, productive forces. To turn science and technology into direct productive forces, a transformation process is required. Scientific theories are a form of knowledge. The process of turning scientific theories into technological achievements in material forms (such as prototypes, samples, etc.) is known as a materialization process. Technological achievements, the results of the materialization process, are still knowledge in the form of drawings, date, appraisals, patent papers, and so forth. These achievements (generally the results of laboratory or small-scale tests) still must go through intermediate or enlarged experimentation so that they can be commercialized and put to use in actual production before they can become direct productive forces. The materialization process which turns technological achievements into technological commodities is the process of development research. It is thus clear that development research is an absolutely necessary link for science and technology to be geared to and serve economic development, the only way for the practical application of technological achievements, a bridge to link scientific research closely with production, and an indispensable kind of scientific research for institutions of higher learning. In the past, institutions of higher learning failed to maintain close links with production, and scientific and technological achievement largely remained as samples, gifts, and exhibits and could not be turned quickly into products and commodities and thus become direct productive forces. The main reason was the failure to pay enough attention to the important link of development research and put it in the proper place.

Will development research hinder efforts to improve the academic level and quality of education. Experience has shown that it has no adverse effect on the academic level and quality of education. On the contrary, it can help improve the academic level and quality of education and accelerate the establishment and development of new disciplines. Generally speaking, development research is the follow-up on basic and applied research, and it should reflect the level of basic and applied research. Moreover, large-scale development research is often a combination of basic, applied, and development research projects, interrelated and sometimes conducted simultaneously. The solution of major technological problems relies on breakthroughs in basic and applied research; at the same time, major technological breakthroughs in basic and applied research; at the same time, major technological breakthroughs also continuously pose new problems for basic and applied research. The history of science and technology shows that scientific and technological development follows its own laws. Some technological inventions and creations are not based completely on knowledge already acquired from basic and applied research, but are technological breakthroughs whose laws are yet to be found from basic theoretical studies. For example, the first and second laws of thermodynamics were summarized by Meyer, Joule, and Carnot years after the steam engine was invented by Watt, and the aerodynamic theory was summarized and perfected step by step after airplanes had already begun to fly. Can such epoch-making achievements of development research be regarded generally as of level lower than that of basic and applied research? It is exactly this kind of research that spurs the in-depth development of basic and applied research.

It not only changes the objective world but impels us to strive for a deeper understanding of the objective world and pursue higher academic standards. Development research requires extensive scientific, technological, and production knowledge and familiarity with the latest research results and development trends at home and abroad and calls for teachers and scientists to broaden their field of vision.

The scientific problems that need to be solved in national economic development often involve knowledge in many disciplines and specialized fields, and their solution requires the cooperation of specialists in these disciplines and fields. The mingling and merging of different disciplines and giving birth to new disciplines and specialties. Experience in this kind of scientific research will enable teachers to update their knowledge, enrich their teaching ideas, strengthen the substance of teaching materials, improve their teaching methods, and enhance teaching quality.

The training of highly qualified people needed for socialist construction requires them not only to have a good grasp of basic theoretical knowledge but to have the ability to solve practical problems with the knowledge they have acquired. Development research has opened up new fields for college students and postgraduate students to choose research and graduation projects and provided conditions and sites for them to engage in scientific research and production practice. Participation in development research can help college students and postgraduates strengthen their ability to analyze and solve problems. Development research projects originate largely from industrial departments and actual production. Student participation in development research shortens the transitional process of integrating theory with practice. When these students go to work, they will be able to apply the advanced scientific and technological knowledge they have acquired more quickly to meet the needs of the industrial departments and production units and contribute to solving technological problems in production.

To promote development research, the schools should establish broad relations with factories and enterprises, promote cooperation between teachers, researchers, and producers, and expand their influence on society so that education will receive wide-ranging support from society.

Development research makes it possible to turn technological achievement into actual productive forces, produce economic and social benefits, and promote economic development and social progress. The institutions of higher learning and their teachers work hard to produce research results. If they can make some money for their work, the money can be used to help finance research work and improve teaching and research conditions and living and working conditions for the teaching and research personnel. This is a very good thing and should give no cause for alarm. It is permissible under a socialist system based on public ownership and characterized by a planned commodity economy. The regulations for compensation transfer of technology officially promulgated by the State Council also gives legal protection for this right of institutions of higher education and teachers. It is absolutely wrong to regard these legitimate activities in scientific research and technological commodity exchange as "making money," "putting money above everything else," and "ignoring

proper duties." What's wrong with getting rich while making the country prosperous and strong? We must not continue to judge right and wrong by the worn out concept that institutions of higher learning are for training qualified people and should uphold "lofty standards" by not dealing with money. Of course, if someone should unscrupulously seek personal gain, "making money" and "putting money above everything else," under the pretense of technical service and transfer of technical service and transfer of technology in disregard of the national interest and the right and interest of one's own unit, that is a different matter.

Thus it can be seen that development research is not only a way for institutions of higher learning to serve economic construction directly and train highly qualified specialists, but an important way for the institutions to increase their vigor to serve the economy voluntarily and their capacity for self-development.

II.

Development research is an important part of scientific research in institutions of higher learning, but what should be the proportion of development research in the scientific research program of a university or college as a whole? How should its development be coordinated with other kinds of research? The writer thinks that it is necessary to make a concrete analysis of the concrete situation in each case, and different cases cannot be treated the same way. Institutions of higher learning are different from either the research institutes under the Academy of Sciences or the local scientific research units and research units within enterprises. In those institutes and units, research is usually limited to a few disciplines and objectives, and the proportions among different types of research in each institute are relatively constant. An institution of higher learning is different. It is a complex system with many disciplines, departments, and objectives. Each university or college offers different courses and pursues different objectives, and the level of achievement of each school or department also differs. Therefore, the proportions of basic, applied, and development research should be different in different schools and departments, and each school or department should have its own emphasis. There can be no set pattern. Institutions can be divided roughly into two types.

1. Institutions of higher learning which offer more major courses with a strong science faculty, good research facilities, and a solid foundation for research work. These are the institutions of higher learning on which China relies heavily to scale the heights of science and technology and achieve the goals of modernization, opening to the outside world and meeting the challenges of the future. They are the important bases for the training of highly qualified specialists for the four modernizations drive. Results of advanced research achieved by universities and colleges of this category can raise the scientific and technological level of institutions of higher learning as a whole. Therefore, it is necessary to deploy these universities and colleges in depth. Their research programs should concentrate mainly on pioneering work on the frontiers of modern science in order to make important contributions to scientific and technological development at an advanced level. Emphasis should be placed on basic research which has good prospects for application and applied research

which is of great significance to the national economy. Technological development research should also be strengthened, but efforts should be concentrated on developing major and key technologies which have a bearing on economic construction and high technologies which can compete at home and abroad. Without this kind of in-depth deployment, China's scientific and technological level will lag farther and farther behind the international level, and we will find ourselves in a passive position and on the receiving end. It is necessary to pay some, but not too much, attention to developing applied techniques to meet the need of economic development at the present stage for construction projects which require a short time to complete, are not sophisticated, and can produce quick results. Paying too much attention to these projects is bound to slow down the achievement of the major objectives and make it impossible to put scientific research in institutions of higher learning as a whole to the best use.

2. Ordinary and local universities and colleges which offer fewer major courses but are also indispensable in developing science and technology. Institutions of this category are generally weaker in science research personnel, research facilities, funds, foundations for research work, documents and data, and information channels, and are in no position to compete with the institutions mentioned previously. They should only do what they can do well and avoid what they cannot and develop their own specialties and strong points. At present and for some time to come, engineering colleges and schools and specialties should concentrate their efforts on applied research and the development of advanced applied techniques suited to China's conditions and actively disseminate and apply the research achievements to serve local economic development. Services should be directed mainly to local and town and township enterprises. Development of these enterprises is an important aspect of China's overall economic growth. At present, however, these enterprises are technologically backward and seriously wanting in technical personnel and equipment. They have the greatest and most urgent need for technologies and can produce the most economical results. Advanced applied techniques may seem "inconspicuous" and "unsophisticated," but they are closely linked to the development of local and town and township enterprises and are in great demand in the technology market. Likened to "small pieces of gold and jade," they are very popular. Projects of this kind require smaller investments, take less time to complete, and can produce quick and good results. Schools should cooperate with enterprises. They can learn from and help each other and solve a series of problems including promoting cooperation between research and production and between production and marketing, fund-raising, test sites, trained manpower, etc. These kinds of research projects are within the capabilities of ordinary universities and colleges. Some people are afraid that this kind of research to develop unsophisticated applied techniques is not of lasting significance, because the emphasis now in the cities and countryside is to invest in the development of intellectual resources and the training of qualified people. Their fear is not groundless. At least they have seen the trend of scientific and technological development. But their reasoning is incomplete. The growth of qualified people follows its own objective laws. As the common saying goes, "it takes 10 years to grow trees, but 100 years to rear people." The training of technical personnel to acquire a certain amount of technical knowledge and the acquire a certain amount of technical knowledge and the ability to conduct creative research work are not something that can be

accomplished in a few years and by running some short-term training classes. The existing scientists and technicians engaged in technological development research can continue to acquire new scientific and technological knowledge, make new inventions, produce new results, improve their own standards, and remain in an advantageous position to master advanced science and technology so long as they do not stand still and fail to move forward.

Of course, the ordinary universities and colleges cannot limit themselves to developing on usophisticated applied techniques to meet the short-term needs of economic construction. Proceeding from actual conditions and on the basis of their own characteristics and strong points, they should also engage in development research on certain important technologies needed for the four modernizations and sophisticated technologies which can be competitive, selecting research projects from a strategic viewpoint. They should strive for breadthroughs in certain fields to distinguish temselves and pursue in-depth basic and applied research on major technological problems to promote the development of entire disciplines.

III.

Scientific and technological development research in institutions of higher learning is beginning to gain momentum. To insure the sound development of this kind of research, it is imperative to formulate suitable policies and adopt effective measures. The following problems need to be studied seriously.

1. Investment for Scientific Research in Ordinrary and Local Universities and Colleges Should Be Properly Increased.

Investment for scientific research is too little in ordinary and local universities and colleges. According to 1984 statistics on 44 institutions of higher learning in Hubei Province, which had engaged in scientific research work, funds for scientific research received by these institutions from all sources totaled 30.53 million yuan. Of this amount, local universities and colleges, which make up half of these institutions, received only 1.3 million yuan, or 4 percent. The situation in other provinces is about the same. The main problem is the scarcity of funding sources and channels. The education departments are the only reliable source of scientific research funds for the institutions of higher learning, but the education departments' financial resources are limited. The Science and Technology Commission has a sizable scientific research budget, but most of the funds are invested in the prefectural and municipal science and technology commissions and the research institutes under provincial and prefectural science and technology commissions. The Economic Commission has a lot of money, but it is used mainly for the development of new technologies, the dissemination and application of research achievements, and technical transformation for enterprises. Funds from various departments and bureaus are also invested for technological development and technical transformation of enterprises under their respective jurisdictions. However, the local institutions of higher learning, which are technology-intensive and capable of producing results in development research continuously, are unable to get more money for scientific research. The success of development research depends much on good preparatory workand still more on a solid foundation in basic and practical

research. Otherwise, it is hard to maintain the momentum. Both preparatory work and basic and applied research require money and materials. Some basic and applied research projects are closely linked to development research. Enterprises want results from development research but are unwilling to finance basic and applied research but are unwilling to finance basic and applied research. Thus, some very promising research projects are unable to continue due to a lack of funds. To bring into full play the strong points of local universities and colleges so that they can make greater contributions to local economic prosperity, more funds for scientific research should be allocated to them by the provincial governments. In addition, the Science and Technology Commission, the Planning Commission, the Economic Commission, and the various departments and bureaus should all make arrangements to invest in local universities and colleges, not only for development research projects but for promising basic and applied research projects which are of interest to them. This is capital construction for local enterprises to undergo technical transformation and adopt new technologies and should not be ignored.

2. It Is Necessary To Adopt a Unified and Reasonable Profit Distribution Policy

Scientists and technicians have two wishes. They wish to use their talents to contribute to scientific and technological discoveries, inventions, and creations, and they wish to have public recognition, a reasonable reward, and proper honors for their achievements. Both wishes are legitimate. The first wish coincides with the needs of our socialist construction. The second is reasonable and permitted and encouraged by the socialist system. To satisfy these two wishes of teachers, scientists, and technicians to the extent possible is one of the major responsibilities of scientific and technical management personnel. First, they should do their best to create the necessary conditions for the teachers, scientists, and technicians to bring their wisdom and knowledge into full play and achieve outstanding results. Second, reasonable distribution procedures should be adopted in keeping with relevant policies so that teachers, scientists, and technicians who have made contributions will receive necessary material rewards and spiritual encouragement. The party and state have tried very hard to do these things, but much remains to be done. For example, there are no unified rules for profit sharing; different units do things in different ways; and the administrative departments are at a loss as to what course to follow. This has created confusion and contradictions in work. Without unified profit-sharing regulations, how should the universities and colleges retain and distribute income? The decision of the CPC Central Committee on the reform of the science and technology management system stipulates: "On condition that they fulfill their primary assignments and that there is no encroachment on the technological rights and interests or the economic interests of their units, scientists and engineers may engage in spare-time technological work and consulting services, and they are entitled to the income therefrom." On the whole, such a measure undoubtedly will arouse the enthusiasm of the teachers, scientists, and engineers and will promote scientific and technological progress and economic development. However, it has brought many problems for the administration of the universities and colleges. For example, teachers have no fixed working hours, so how can a distinction be made between what is done in their spare time and what is not? Scientific and technological knowledge and intelligence are in the heads of teachers, scientists, and engineers, so how

can it be determined which part belongs to their units and which part is their personal property, and whether the technological rights and interests of their units have been encroached upon? It is not clearly stipulated that teachers, scientists, and engineers must request and obtain the prior approval of their units to engage in spare-time scientific and technical work. Without knowing the specifics, how can the units evaluate their work performance? Therefore, at least each province should have its own unified regulations governing income distribution and spare-time scientific and technological activities. Those who have achieved good results in basic and applied research should also receive appropriate material encouragements to arouse their socialist enthusiasm.

3. It Is Necessary To Have a Reasonable Evaluation Standard for Scientific and Technological Achievements

In academic circles, particularly among those engaged in science studies, there are still some who cling to the old concept that looks down on technology. To these people, the solution of technical problems in production and the popularization and application of research achievements are "petty" and "low-level" activities, and research reports of this nature do not command respect in the academic world. They think that only those pursuing theoretical studies can turn out high-standard academic papers. For those aspiring for academic titles, academic theses carry far greater weight than technological research reports. Technological research achievements, even if they have won some awards, are not valued. To a certain degree this has dampened the enthusiasm of comrades engaged in technological development research. Different kinds of research produce different results in terms of academic value and economic and social benefits. They cannot be compared by the same yardstick, certainly not between the strong points of one and the weak points of another. Standards for evaluating the results of different kinds of research projects should be established on the basis of comparable factors. For basic research, the emphasis is on the academic level; for applied research, on the academic level and applied goals; and for development research, on the economic and social benefits. Each kind of research should have its OWN standards for evaluating research achievements as objectively and reasonably as possible.

4. It Is Necessary To Set up Rational Administrative Organizations

The growth of technological research, technological consultation and other technical services has given rise to the question of their management. Institutions of higher learning in China have set up all kinds of management organizations such as boards of directors, scientific and technological development departments, technological consultation and service departments, technological development companies, technological development centers, and so forth. In some schools, a separate technological development department has been set up, in addition to a scientific research department. In others, scientific research and technological development are administered by a single department, under which work is divided among specific persons and section-level management branches. Opinions differ as to which is the best setup. First, because this is a new thing, and there is not enough practical experience, people are still groping their way forward. Second, actual conditions are

different in different universities and colleges. There are engineering schools, science schools, liberal arts schools, and universities with liberal arts and science colleges, or science and engineering colleges, or liberal arts, science, and engineering colleges. Development research also differs from school to school. Therefore, the administrative setups cannot be uniform. By nature, development research is a type of scientific research, a continuation and development of basic and applied research, including the popularization and application of research results.

It is not advisable to separate development research completely from basic and applied research because they are closely related to and sometimes overlap each other. They are different, however. First, their research projects come from different sources. Basic and applied research projects are mostly assigned by state and provincial departments, subsidized by science foundations, or chosen by the schools themselves and are known as vertical tasks. Development research projects are usually commissioned by, or conducted in cooperation with industrial and mining enterprises and production departments and are known as horizontal tasks. Second, their funds come from different sources. Funds for vertical tasks come mainly from government allocations and science foundations. Funds for horizontal tasks come mainly from the commissioning units or from technology transfer contracts. Third, their management requirements are different. Vertical projects are under planned state management or follow science foundation management procedures. Horizontal projects are managed mainly according to contracts negotiated and signed by two or more sides. Fourth, their financial management requirements are different. There is no distribution of income on vertical projects, while part of the income on horizontal projects can be set aside for distribution. Moreover, development research is geared to production, and its management organization should be an important channel for research achievements to move into production, a conduit between research and production. The functions and tasks of development research management organizations and scientific research departments are linked to each other and sometimes overlap. While a technological development management organization is an organic part of a scientific research management setup as a whole, it is relatively independent. Scientific management should combine overall control with a division of labor and responsibilities. For universities, unless their technological development tasks are unusually heavy, their technological development management organization (it may be called technological service department or technological development department) should be combined with their scientific research department, but they should retain the two signboards which are useful for outside contacts and work expansion. Under this department, a section-level working body should be set up to manage technological development, working independently and separated from the management of vertical projects. There is some overlapping and connection between the two, and it is necessary for them to cooperate closely. The department will take the necessary steps to insure that. This kind of management system is more realistic, in keeping with the principle of scientific management and adapted to the new situation of fierce competition following the opening of the technology market and the commercialization of technologies. Some key engineering colleges and schools are heavily engaged in horizontal tasks, and it is necessary for them to have a separate management body from the scientific research department, but it is also imperative to strengthen mutual cooperation so that the scientific research work of each school can be developed in an organic and coordinated way as a whole.

NATIONAL DEVELOPMENTS

ASSESSMENT OF SEMICONDUCTOR FACILITIES, DEVELOPMENT PLANS

Shanghai DIANZI YU ZIDONGHUA [ELECTRONICS AND AUTOMATION] in Chinese No 1,
20 Feb 86 pp 10-14

[Article by Shen Jiansen [3088 1696 2773] of the Shanghai Optics Company]

[Text] I. Introduction

The microelectronics industry is a pilot industry. The integrated circuit is the nucleus of the microelectronics industry. There have already been many demonstrations of the specialized facilities used in integrated-circuit development, research, and production. Based on developments in China in recent years, the well-known microelectronics expert Wang Shouwu [3769 1343 2976] said: "The special points regarding developments in integrated circuits are that the degree of integration is becoming greater and greater, the dimensions of the devices smaller and smaller, and the construction of the circuits more and more complex. Right now, China's integrated-circuit industry falls short of the international standard and we must try hard to catch up. Importation of advanced facilities and technology is of course necessary, but we must make the integrated-circuit industry take root and germinate in China. It is not good just to rely on the importation of advanced facilities. We must rapidly establish China's own industries with specialized facilities for integrated circuits; this is a task of top priority. Integrated-circuit specialized facilities can be divided roughly into the following three categories: design of plating facilities, manufacturing technology, and analytical measurement and testing. Preparation of these facilities must utilize advanced technology from the fields of optics, vacuums, electron beams, and microcontrols. Thus, we must energetically work together on each aspect and then we will be able to fulfill our mission."

In November 1984, the chief researcher of the U.S. (Lande) Company's political department, Dr (Polake), while visiting China, said: "There are not many fundamental research problems in printed circuits. Right now, production problems are of importance. China should place its emphasis and energy on production management, technology administration, and manufacturing facilities." He also said the U.S. Government has moved slowly on high-technology transfers to China. In fact, regarding the transfer of high technology, the United States has all along taken a cautious attitude. The Reagan administration has taken a

relaxed stance regarding exports to China. In early 1982, the export to China of contact photo-etching facilities was permitted. At that time in China, in the latter half of 1981, three models of contact/close photo-etching machines passed a technology appraisal. These three models of photo-etching machines were the Shanghai model JKG-3, the Chengdu model JK-1, and the Harbin model KHA75-1

Presently, the United States allows exports to China of high technology for image generators, etc., for complete equipment sets of up to 13-inch silicon wafers. But internationally, complete 4-inch equipment sets are already universally established, and the transition to 6-inch sets has already begun. In December 1984, at the international semiconductor equipment and materials exhibition held in Japan, there was already no interest in image generators. It was reported that the GCA Company of the United States exported to China eight 3600F image generators and eight 3696 precision reducing machines at a value of US\$8.33 million. In addition, the exportation of 4,800 DSW stepped repetitive photo-etching machines to China has been relaxed.

From the strategic objective of catching up with international standards, the Shanghai economic district is one of the important bases of China's micro-electronics industry. But on the importation of international high technology, particularly in microelectronics processing technology and equipment, where there are all kinds of restrictions and embargoes, we need on the one hand to adopt measures to introduce advanced technological equipment from abroad, but more importantly, we need to rely on the strength of our own country, on the industrial base of the Shanghai economic district, and on the power of our policies, and to take steps to change the present situation rapidly.

II. Status of Facilities

1. Development Survey

Internationally, for the last 3 years, the rate of renewal of specialized equipment for integrated circuits has been exceptionally fast. In 1982, 4-inch production technology lines were universally established. Also, quite a few 5-inch lines had been established. In 1983, there was partial expansion of the lines to 6 inches, with 4-6 inches in common use. In 1984, the facilities in U.S. semiconductor works were already being transformed to 6 inches, with a large number of 5-inch facilities that are possibly not in use. The Intel Company began production with a 6-inch production line in early 1984. According to the August 1983 issue of Japan's ELECTRONIC MATERIALS report, Japan's Toshiba produced 8-inch monocrystalline silicon. The U.S. IBM Corporation placed an order with the Censor Company for an 8-inch photo-etching machine. It is estimated that in 1987, 8-inch production lines will be batch-producing integrated circuits, 10-inch production lines will be realized in 1991, and U.S. specialized facilities will lead integrated-circuit technology for 3-8 years.

Facility renewal follows the rapid development of integrated-circuit devices, the peak being the batch production of the 64K circuit at the end of 1984. In 1985, each integrated-circuit device plant began 256K DRAM batch production.

2. Competition Between U.S. and Japanese Facilities

Between 1979 and 1980, 60-70 percent of Japanese facilities were imported from the United States. By 1983, Japan provided 70 percent of its own specialized facilities. Also, facilities formerly imported to Japan from the United States were being exported to the United States. One reason for such an astounding change in a few short years is that the Japanese Government, in a 4-year period starting in 1976, emphasized and subsidized specialized facilities resulting in joint research on VLSI's. For example, Japan's Nikon Company decided to manufacture stepping repetitive photo-etching machines which were formulated through Japan's VLSI research program. In order to supply VLSI processing facilities to Japan's five largest electronics firms, MITI and five large Japanese electronic and other firms raised US\$285 million in subsidies to be used for the development of new types of facilities. The Canon Company also obtained a MITI subsidy to trial-manufacture a new type of stepping repetitive photo-etching machine. Presently, Japan's Fujitsu, Ltd. has plans to use the Canon facilities to replace the stepping repetitive photo-etching machine made by the U.S. GCA Company. Japanese integrated-circuit manufacturing firms and facility-manufacturing firms constantly and jointly develop advanced methods for specialized facilities. In addition, Japanese facility firms do not merely concentrate on the norm to advance, but in all respects consider the consumer and in every possible way satisfy the needs of the consumer. They emphasize facility reliability and guarantee the rapid installation of facilities.

Some estimate that in 1980 the world facility market totaled \$1.4 billion, with semiconductors making up 10 percent of total sales. In 1981, the world facility market totaled \$2,884 million, with semiconductors accounting for 14.7 percent. In 1982, the world facility market totaled \$3.44 billion, and it is estimated that in 1985 it could reach \$5.6 billion. In 1983, the Japanese semiconductor specialized-facility market was 24 billion yen (equivalent to \$962 million) and in 1984 it reached \$2.5 billion, estimated to be just \$200 million less than the U.S. market. Of the several main facilities for handling silicon chips, for example, scanning projection photo-etching machines, Japan's Canon Company and the U.S. Perkin-Elmer Company have equal shares, each accounting for 50 percent. In stepped repetitive photo-etching machines, Nikon occupies 50 percent and GCA has 45 percent, all others accounting for 5 percent. In dry etching, Japan has 45 percent of the market. In wet etching, Japan has 70 percent of the market. In ion etching, Japan has 65 percent of the market. In vacuum vapor deposition equipment, Japan has 75 percent of the market. In spattering equipment, Japan has 35 percent of the market. In assembly equipment (assembled equipment), Japan has absolute dominance. In scribes, it has 95 percent. In seam welders, it has 75 percent. In plastic packaging machines, it has 75 percent. In measurement and testing equipment, Japan holds a clearly superior position. For example, in multiple probes, it has 90 percent. In LSI logical measurement and testing instruments, it has 50 percent. In LSI memory measurement and testing instruments, it has 75 percent.

3. Continuing Ahead

There are those abroad who consider that in the large-scale and ultra-large scale production of integrated circuits, the ratio of the effect of facilities to manpower is 8 to 2, but optics type facilities occupy 35 percent and funding stands at 30 percent. It can be seen from the situation abroad that the well-known optical plants in each country are all engaged in the development and production of specialized facilities for the integrated-circuit industry.

Due to the expansion of the semiconductor market and the sharp increase in the demand for specialized facilities during 1983 and 1984, Hitachi, Ltd., Hitachi (Shehei), Toshiba Machine Co., Ltd., Mitsubishi Chemical Industries, Ltd. and (Xitiecheng) joined the ranks of those companies from which we imported specialized manufacturing equipment.

During integrated-circuit industrial production in the 1980's, optical photo-etching equipment continued to occupy a dominant position. C. Macdonald, director of the U.S. Perkin-Elmer Company semiconductor device department, has compiled the following statistics: In 1982, worldwide production line photo-etching machines totaled 5,400 units; of these, 1:1 reflectance type scanning projection photo-etching machines totaled 3,000 units, accounting for 56 percent; and stepping repetitive types totaled 500 units, accounting for 9 percent. It is estimated that between 1985 and 1990 new photo-etching technology might be adopted, namely differential scanning devices which combine scanning types and optical reducing projection types (or Zicheng saomiao guangke shebei). It can bring into play both the high efficiency of scanning projection photo-etching facilities and the high resolving power of reducing projection photo-etching facilities. The accuracy of a laser can be used as the light source for photo-etching. By 1990, the number of photo-etching machines may reach 14,000 units. Of these, 6,300 will be of the stepped repetitive type, accounting for 45 percent; 3,500 will be 1:1 reflectance scanning projection photo-etching machines, accounting for 25 percent; and differential scanning types will number 1,540, accounting for 11 percent. This combining of photo-etching technologies will reduce the cost of large-scale and ultra-large scale manufacture of integrated circuits. It can be foreseen that the use of combined types will both extend the usage time and improve the usage value of optical photo-etching.

4. Status of DSW (Stepping Repetitive Photo-etching Machines)

DSW is the key piece of equipment which is indispensable for the 2-3 micron VLSI device production line and the development of the 1-2 micron VLSI device. According to the RIA investigation in the United States, in a few short years (the first DSW unit was put out by the GCA Company in the United States in 1978), there are already more than 10 plants in the world producing 23 varieties. From data from the 9 main firms it can be seen that production (including 1985 output) is 5,333 units valued at \$3,478 million (see table).

Firm	Pre-1982	1982	1983	1984	1985	Value (\$1,000)
Cameca	0	4	16	35	50	700
Canon	20	24	72	100	100	310
Censor	9	25	100	100	100	750
GCA	300	240	540	540	540	750
Nikon	10	50	100	200	200	600
Optimetricx	15	50	100	150	150	700
Philips	10	12	25	50	50	950
TRE	26	96	156	200	200	660
Ultratech	18	50	100	200	200	330
Annual total	408	551	1,209	1,575	1,590	

5. Good Cycles

The development of specialized facilities spurs on integrated-circuit device production plants to ever newer facilities. The newer facilities lead to a higher degree of integration in the circuits produced. Performance is improved, the cost is reduced, production output is increased, and the reduction in price has doubled and redoubled. For example, in autumn 1980 the 64K DRAM cost \$89-150 each. At the end of 1981, it cost \$10 each. At the beginning of 1982, it cost \$5-6 each. At the beginning of 1983, it cost \$3.2 each. It is reported that at the beginning of 1985, it cost \$1 each and in the latter half of the year the cost was lowered to \$0.43 each on the Hong Kong market. Taking Japan as an example, this price is the result of development and application of specialized facilities. The growth in successive years of integrated-circuit production output has been such that output in 1982 was 4 billion units, which was 1,335 times that of 1966. In 1983, output reached 5.95 billion and in 1984 it reached 7.13 billion.

From the worldwide scope it can be seen that as a result of the improved standard of facilities, there is an improved standard of devices. The development of higher standards of electronic machines means mutual advancement among facilities, devices, and complete machines.

One generation of facilities, one generation of devices, one generation of complete machines. Taking MOS devices as an example, internationally the technological equipment of the 1960's was able to achieve a line width of 12 microns, which could make 256 DRAM. In 1983, 1M DRAM was achieved. In February 1984, Toshiba introduced the world's first 256K CMOS SRAM integration equivalent to 1M DRAM. Taking micro-handling machines as an example, 3 years produces a newer generation. Following the advancement of high-integration devices, it is estimated that in the 1990's, 48-64 bit micro devices will be realized.

6. Developments Ahead

Optical projection generators entered the market in 1967 and, after several years of competition, developed a high standard. Presently, 80 percent of U.S. platemakers still use optical projection generators. After the GCA Company came out with the 3600F, their most spectacular development, in 1978, the 4600L projection generator adopted a laser light source which could etch a pattern within 1 micron on a chrome plate 28 times per second. The TRE Company's LPG laser projection generator can make a 100 mm by 100 mm plate within 30 minutes with a precision of 0.35 micron. Compared to electronic-exposure platemaking, the speed is 6 times greater and the cost is one-half to one-third.

GCA's model 8696 precision reducing machine can satisfy the technical demands of 256K and 1M DRAM devices. That company's stepping repetitive photo-etching machine also developed to the 8000 DSW series, entered the sub-micron grade, and is grade 10 under ultra-dry conditions. The Perkin Elmer SRA-9000 series with the ASM model PAS-2500 achieves a precision of 0.1 micron (3σ) with sub-micron discrimination. The Canon Company's model FPA-1550 has a discrimination of 0.1 micron and can be used in 256K and 1M DRAM device production.

The U.S. semiconductor equipment industry has all along had a leading position in the world, but the U.S. enterprises do not always use a "large and complete" or "small and complete" policy with each company very cautiously adopting new technology and seeking great economic benefits. For example, optical lenses are purchased from Zeiss of Germany. The United States still has many companies based on a single technology with specialized manufacturing supplying high-quality spare parts. For example, the HP Company has laser measurement instruments. Del-Tron specializes in the manufacture of miniature slideways and work pieces. The Superior Electric Company's stepped motors achieve an equivalent of 0.01 micron, with a speed of 2 mm per second, over a distance of 50 mm. The Align-Rite and White-Cube Companies make ultra-dry chambers and so forth.

7. China's Specialized Facilities

Those engaged in specialized facilities within China have one fundamental strength. Presently there are 65 units engaged in technical facilities, testing and measurement instrumentation, physical-chemical analytical instrumentation, and so forth, creating a total of 260 products. This is a result of our self-reliance. We must not underestimate our capabilities.

In a few years, we have developed and produced several dozen types of products, for example, projection photo-etching machines, ultra-violet close-type photo-etching machines, image generators, and each type of testing and measurement instrument, masking comparative microscopes, measuring microscopes, differential interference microscopes, level measurement and testing instruments, liquid

particle analyzers, chrome-masking wet-corrosion end-point test devices, ion beam etching machines, selective epitaxy devices, and so forth. Among these, some were especially welcomed by the consumer. For example, already more than 3,600 photo-etching devices have been sold for 20 million yuan. Also, 605 Chinese-built crystallization ovens were sold for 47 million yuan, and 2,600 magnetic sputtering devices for 53 million yuan. Crystallization ovens are being sold in Eastern Europe. But compared with foreign equipment, the main conflict with Chinese-built equipment is the deficiency in reliability and stability and the long time between preparation and production. Regarding the former, there is the poor reputation of device-manufacturing plants. Regarding the latter, our facilities and international specialized facilities are far apart. It still remains to be changed from a bad cycle to a good cycle of production of Chinese-built facilities and integrated-circuit devices. Besides the low industrial base and technological standard, the standard of organizational management is also an important factor. These few years, although the State Science and Technology Commission and the State Council are tackling key problems in a big way, with the ϕ 50 and ϕ 75 silicon chip production line going into production and Chinese-built facilities basically capable of complete sets, still by and large there is not enough emphasis on facilities nor enough investment to set up teams.

There is a great need to import advanced specialized equipment from the United States to accelerate the development of China's semiconductor industry, but each department is now spending a large amount of the nation's capital. The continued low standard of imports amounting to several hundreds of millions is very serious, and more pitiful is that each does things its own way with no overall planning. Without the chance to absorb and digest advanced technology from abroad through the importation of equipment and with difficult exchange among departments, it is extremely disadvantageous toward development of China's semiconductor specialized-facility industry.

III. Development Tactics

If we are to build up China's semiconductor specialized-facility industry, we must define the macroscopic program of the Seventh 5-Year Plan. Otherwise, after 1990, we will not be able by ourselves to build up the national specialized-facility industry. At that time, we will, as before, spend a large amount of capital importing obsolete lines from abroad, produce integrated-circuit devices of a low standard as before, and, as before, fall behind the more advanced nations. However, this cannot be tolerated by the people; it is imperative to build up our own country's specialized-facility industry.

Japan changed from a backward nation with respect to specialized facilities to an advanced nation. It went from a 70 percent dependence on U.S. imports of equipment to providing 70 percent of its equipment itself in only 8-10 years. There is much experience and many measures worth looking into by our leading departments and experts.

During the Seventh 5-Year Plan, from a practical point of view, regarding the 5-micron line width and improvements on the 13-inch-diameter facilities, we should steadily make the transition to the 4-inch diameter. Representative

photo-etching facilities such as the 1:1 scanning photo-etching machine should practically and quantitatively meet the demands of newer production lines. We must engage in scientific research to prepare for 1-micron-line width facilities the way the 3-micron and 5-micron facilities entered the production line. Of course, Nikon is already proceeding with sub-micron line widths, but from a realistic point of view, we still need practical experience. For this reason, we must develop simultaneous x-ray photo-etching technology and the production of specialized facilities, and form echelons as outlined in the following simple viewpoints.

1. Building up the Specialized Facility Industry Definitely Requires Government Subsidies

The highly concentrated technology of the specialized-facility industry is not a profitable industrial sector, especially in its early stages of development. It has only social benefits and for a time it is difficult for specialized-facility manufacturing enterprises to realize economic benefits. There is no approved macroscopic program of national investment and it is unable to develop by simply depending on the strength of the enterprises.

2. Setting off Realistically, We Will Be Victorious in the Practical Aspect of Facilities

The United States, Japan, and several of the western European nations developed on a good industrial base, have advanced technology for complete sets, can improve upon the technological norm of their facilities, and are capable of a rapid renewal of facilities. We should not set high goals for our specialized facilities, but rather assure the criteria of long-term stability and reliability during normal operation.

3. Provide Good Services to Consumers

Presently, the standard of our facilities is not high and service is especially important. We must be rapid in installing new facilities. We must guarantee the shortest time for installation work and set up maintenance teams, particularly with respect to the most recently imported 28 lines. It is estimated that after 1 or 2 years, there will be much maintenance and service work and through such maintenance and inspection we can digest and absorb foreign facilities. This is work of great importance.

4. Set up Laboratories Centered on Specialized Facilities

A major conflict in the present development of specialized facilities is the long cycle time. This includes the long time involved in the technical testing of facilities (sometimes as much as 1 or 2 years) because the facility development units do not have the means for technical testing. In addition, device production plants cannot enthusiastically do experiments as facility development units. Thus the establishment of central laboratories is very much needed. The

goal of establishing specialized-facility laboratories will strengthen the development and production of Chinese-built specialized facilities and, moreover, it is a major link in the consumer unit's assimilation of the facilities and service after the sale of facilities by the manufacturing plants.

5. Regarding the Carrying Out of Technological Reform by Specialized Facility Plants

Technological reform will strengthen the specialized-facility plants. It can be done with a small investment with good results. Newly constructed specialized-facility plants require a large investment and they are not able to go into production immediately. If China can use 20 percent of the capital used to import specialized facilities, that is, approximately 200 million yuan, for reform, we can change the appearance of China's specialized facilities.

6. Eliminate "Large and Complete" and "Small and Complete"

There are many categories of specialized facilities and a multitude of strong professions. Neither one unit nor one district nor even one nation can encompass them all. Thus it is imperative that a program develop in the area of spare parts. In developing specialized facilities, it is inappropriate to over-emphasize national production. We should freely open channels and rapidly utilize high-quality spare parts from abroad.

7. Cooperative Financial Management

China maintains a superior position in terms of its labor force, and also a well-trained industrial technological contingent; but with second-rate products from abroad, we still need advancement and should in every way possible cooperate in the financial management of foreign capital. Learning the technology from abroad to accomplish cooperative financial management requires little expenditure and produces good results.

8. Protect National Industries

We must protect advancement, not backwardness. We must ban the importation of foreign facilities which are similar in function to those produced nationally. We must strengthen management, which should be established on a feasible foundation. The Paris Committee can control the advanced technology of the capitalist nations and place an embargo on the socialist nations. Why can't we block the repeated importation of low-standard facilities? Why can't we protect our national industries?

9. Cherish Qualified Personnel; Make Appropriate Changes in the Treatment of Development Personnel

The work of the specialized-facility personnel is long and drawn out. It generally takes more than 3 years (sometimes more than 5 years) to achieve good results. The intensity of the labor is great, renumeration is small, bonuses are few, and they still must risk the hazards of failure. Thus, we must give

them understanding and appropriate treatment to let them do conscientious work. Cherishing our qualified personnel is a prerequisite to making our specialized facilities prosperous.

10. Use Imitation as a Dominant Factor; Strive for Achievement Through Imitation

We should ensure the developing position of specialized facilities by importing advanced sample products and sample machines and disassemble and copy them. In this way we can cut down on the long process of our own search for knowledge. Through imitative processes, by absorbing and digesting we can create; this is the route successfully taken by the Japanese and I think the Chinese people should not fall short of the Japanese.

13226/8309
CSO: 4008/1113

NATIONAL DEVELOPMENTS

FUND CREATED TO SUBSIDIZE YOUNG SCIENTISTS

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 24 Oct 86 p 4

[Report by Wang Yougong [3769 0645 1872]: "The State Will Establish a Youth Science Fund Next Year"]

[Text] To discover and train qualified personnel and to promote the showing of talent among outstanding young scientists, the State Natural Sciences Foundation proclaimed on 23 July that beginning next year a Youth Science Fund would be established.

This fund will cater to the whole country and will be used to subsidize engagement in natural sciences basic research and some applied research. For all young scientists in age groups 35 and under, those who have already obtained the PhD (or equivalent level), those who can independently carry out research, whose scholastic thinking is active, who have an exploratory and innovative spirit, and whose attitude toward study is correct may apply.

The Youth Science Fund will employ recommendations by specialists and the principle of preferential support. It will require that research topics be new and that research programs be absolutely feasible, that the applicants be the person responsible for the topic, and that there be an emphasis on youth in making up project personnel. This fund will encourage young scientists to carry out new explorations at the forefront of advances in a discipline; it encourages interdiscipline, interunit cooperative study. Youth who are carrying out innovative research in frontier areas or under difficult conditions will be given preference in consideration. Those with excellent records will be rewarded.

Particular working conditions will be created for those youth who have gone abroad for advanced studies and are to return home, and it has been announced that there is also a resolution that young scientists who are studying abroad and who meet the subsidy qualifications may apply before they return to this country, and the units of those who win approval will subsidize them after beginning work upon their return. This will be in effect for 1 year.

The highest funding amount allowed for each subsidy from the Youth Science Fund may not exceed 50,000 yuan. Application documents and recommendation documents will be uniformly worked out by the State Natural Science

Foundation, and those who require them may ask for them from pertinent departments, commissions, and offices of the State Council, from the science and technology commissions and offices of higher education of each province, city, and autonomous region, from the Chinese Academy of Sciences and its branch academies, related industries, and local science fund organizations, and from embassies (or consulates). Applications for 1987 will be accepted from 1 January through 31 March.

There will be 85 recipients of subsidies in the first year, among whom 10 will be drawn from each of the disciplines of mathematics and astronomy, physics, chemistry, earth sciences, and the information sciences, and 15 from each of the disciplines of biology, materials sciences, and engineering sciences, with 5 from management sciences.

The Youth Science Fund will also selectively provide assistance to significant national scholastic exchanges of youth scientific educational activities.

12586
CSO: 4008/2025

NATIONAL DEVELOPMENTS

CAS EFFORT TO FOSTER YOUNG SCIENTISTS REPORTED

Beijing RENMIN RIBAO in Chinese 8 Nov 86 p 3

[Text] The Chinese Academy of Sciences (CAS) has made the earlier production of talent and the greater production of talent to be major goals throughout the Academy. They will adopt various means to train and support young scientific and technical talent, which will generate a better response.

Active provision of a platform for academic exchanges for young scientists and technicians.

To change the situation in which there might not be personnel in later generations, the entire Academy stresses the improvement of the scholastic levels of young people. Many units have organized scholastic activities of various kinds, and especially a series of academic conferences for youth, which will provide them with a platform for activities. At the end of April this year, the Science and Technology Youth Federation affiliated with geographical interests in CAS established a mass meeting and a first academic conference in Beijing, where they discussed various problems such as new theories and new methods with which to develop the discipline of geography.

In July of this year, the Shanghai branch academy held a "1986 Summer Academic Conference for Young Biologists," where 115 young biologists participated in the conference. The conference received 174 papers, and they arranged activities such as academic reports, wall newsboard exchanges, and conferences with well-known scientists. Adopting a format in which the young people were in charge and where they freely brought up questions and entered into exchanges, the activities were warmly welcomed by those participating in the conference. Specialists who were part of the papers evaluation efforts felt that among the 60 academic papers given at the conference, 42 percent were papers that were innovative or had a higher scholastic value and level of work.

Adopt feasible methods to support young science research talent.

To support the phenomenon in which young talent that is accomplished and representative shows itself, in 1985 CAS established the Fund for Young Science for use in supporting young people whose work is accomplished and capable to get into topics on their own. On last year's basis, this year the

size of the fund was increased, and an award fund was set up for young scientists that serve the entire country, which further advanced these efforts. The Shanghai branch academy also set up a young-scientist fund beginning last year, and subsidized topics have already produced some results.

They also tried setting up a relatively independent research body and laboratory that focussed on young scientists and technicians. From the "Hope" Computer Company organized by more than 20 graduates and graduate students from the Institute of Computing, 6 achievements were rewarded in an evaluation of Beijing electronics technology application systems and application projects. They were awarded the designation of "an advanced unit in electronic information technology applications" by the Beijing Municipal Government and the Beijing group for regional electronics promotion.

Lead young people into becoming the new type of talent needed in our four modernizations.

This academy not only pays attention to cultivating scientists of profound attainments in their own discipline, but also intentionally cultivates complex talent that both has a certain scholastic level and also can also make itself known in any other area.

This year, of the activities "to promote contributions by the Academy of Sciences to planning and policy" as organized by the academy group committee, the Xinjiang youth conference on economic and social development attended by youth in units affiliated with the Xinjiang branch academy organizations and the conference for Liaoning Province young and middle-aged intellectuals to make suggestions for the seventh 5-year plan participated in by youth from the Institute of Forestry and Soil were both this kind of activity. Youth from the Xinjiang branch academy had 6 papers awarded prizes of excellence, and the paper of one youth from the Institute of Forestry and Soil was also awarded a prize for an excellent paper at the conference.

These methods of the Chinese Academy of Sciences have been beneficial in invigorating scholastic thinking and in allowing youth to take on responsibilities earlier.

12586
CSO: 4008/2018

NATIONAL DEVELOPMENTS

LOCALLY-ADMINISTERED INSTITUTE DISCUSSED

Beijing BEIJING KEJIBAO in Chinese 12 Nov 86 p 1

[Report by Bie Qinghe [0446 3237 3109]: "The Rise of a Locally-Run Institute"]

[Text] There is a locally-run institute among the forest of science research academies and institutes in Beijing that only has 20-some people. It is outstanding because of its unique research modes and by having science research achievements of a certain level. This has attracted increased respect from people of insight.

This institute is the Beijing Institute for Physical and Chemical Applied Technologies. Since 1980, when Ji Shiying [4764 0013 3467] and a few comrades left the Chinese Academy of Sciences together, various discussions have been progressing noisily for more than 5 years. Simply put, these discussions concern just two words: right or wrong.

Ji Shiying and his colleagues have been quietly doing their own work according to predetermined goals in the midst of the hubbub of that endless stream of discussions. The goals that these scientists and technicians, past middle age, embrace are simply that for the China that has undergone a period of turmoil, what are most needed now are activities of concerted efforts in all areas, not just sitting around and talking. Scientific and technical workers have the mission of scientists and technicians, which is to produce more scientific and technical achievements as needed by society and as quickly as possible.

Now, after 5 years, this locally-run institute that was begun with nothing has built a laboratory of more than 1,000 sq m and has produced more than 30 scientific and technical achievements of a particular level. There is an instrument factory in Yunnan that used to use foreign currency to import cartridge high-stability instrument power supplies from the (LAN DE) company of England. To save on foreign currency, this plant solicited bids publicly in the newspaper wanting to resolve this problem domestically. In time, the bidders mounted up, but the winner was this locally-run institute. They quickly accomplished the task of developing a high-stability instrumentation power supply.

To allow science and technology to become direct production forces is the vocational aim of this institute, and is also the motivating factor behind the opening of this institute. Soon after Ji Shiying had graduated from the modern physics department of the Chinese College of Science and Technology, and had just been sent to the Academy of Sciences, a question continued to bother him: why had post-war Japanese industry been able to jump into the forefront of world ranks so quickly? After much thought, he realized that this certainly was not because Japan had discovered any major scientific theories, nor had it produced a large group of outstanding fundamental theoreticians, but rather that they had put great effort into applying advanced world science and technology to all fields. To make China flourish, we should similarly put our efforts into scientific and technical achievements. In 1980, when the tide of reform was surging in the Chinese Academy of Sciences, Ji Shiying quickly elected to leave the Academy and run a firm that aimed at disseminating and applying technology. Over the past few years, they have signed research and development contracts in accordance with social needs, have sought development funds among social requirements, have trained personnel through development activities, have accumulated funds through doing business, have added equipment, and have continued to grow strong.

Regarding their personnel system, this physical chemical institute has maintained a system with a small core contingent, which is a stable body that fights to carry on the business. At the same time, it also maintains a broader-based contingent of specialists and advisors that does not have a fixed boundary, which is a large, strong technical reserve. Any specialist who is intent on serving society can show his stuff on this "stage." On behalf of the future of the physical chemical institute, they have also made the training, discovery, and gathering of young talent as one of their important tasks.

The Institute for Physical and Chemical Applied Technologies has received support from all aspects of society. Comrades Pei Lao [5952 5071], Tian Fu [3944 1133], and Li Baoheng [2621 1405 1854] of the China Science Associations, Comrade Zhao Qiqiu [6392 4860 4428] of the municipal science association, and Comrade Shen Zhang [3947 3864] of the State Council Science and Technology Leading Group have all given them pointers.

The Institute for Physical and Chemical Applied Technologies was fortunate. Its fortune was not only in their encountering leaders who would support it in this way, but even more so in its having been born and developed in this glorious age of reform. It could only have blossomed in our current period, and it is the pride of this time.

12586
CSO: 4008/2024

NATIONAL DEVELOPMENTS

XIAN JIAOTONG UNIVERSITY GRADUATE PROGRAM DESCRIBED

Xian SHAANXI RIBAO in Chinese 22 Nov 86 p 1

[Report by Jiao Yanyuan [3542 1693 3293]: "Pay Close Attention to and Train High Level Technology Talent"]

[Text] At the Graduate Institute of the Xian Jiaotong University, reform of the graduate student training system and strengthening of the building of major disciplines has resulted in the training of a group of high level scientific and technical talent.

There are 28 specialties at this graduate institute for which the PhD may be granted, and 48 teachers with doctorates. The masters degree is awarded in 53 specialties. There are two doctoral candidate rotating positions in metallic materials as well as heat processing and machinery manufacture. There are 1,843 graduate students, of whom 151 are doctoral students and 2 are doctoral candidates. In order to allow the doctoral students and masters students trained in this country to keep abreast with the levels of graduate students from first-line schools throughout the world, the graduate institute has adopted a series of reform measures, as for example a strict degree system to ensure the quality of degrees; enhancement of the building of the leadership contingent to perfect the degree curriculum and fully arouse the enthusiasm of teachers and graduate students. In recent years, 13 people have received doctorates and 823 have received masters degrees. Of the graduating graduate students, the majority have become the teaching, science research, and technical key strengths of their units. In their biological and medical instrumentation and engineering specialty, they have joined with units from the Xian Medical College, the Medical College of the 4th Army, and the Chinese Academy of Medical Sciences to jointly train 96 graduate students and to develop experimental sites for applied degrees for on-the-job personnel.

To better and more quickly train high quality specialist talent, not long ago the graduate institute set up a major discipline management section, which got down to work with 28 doctoral students in the school to initially determine a group of major disciplines.

12586
CSO: 4008/2028

NATIONAL DEVELOPMENTS

PATENT OFFICE DIRECTOR DISCUSSES PATENT PROCEDURE

Beijing ZHONGGUO ZHUANLI [PATENT REVIEW OF CHINA] in Chinese No 10, Oct 86
pp 5-7

[Excerpts of speech by Huang Kunyi [7806 0981 4135], director of the China Patent Office, to the Jiangsu Province Patent Conference on 27 June 1986]

[Text] Comrades, Deputy Governor Yang said it well and I quite agree: patent efforts in Jiangsu Province have the great support of provincial leaders and are certain to develop well.

I have planned to speak to several questions.

I. The situation regarding the implementation of the patent law

Under the strong impetus of the open-door policy of our reform, the patent laws went into effect beginning 1 April last year [1985]. Generally speaking, progress has been smooth. This is shown in the following aspects.

First, there has been a relatively smooth initiation of all legal processes. From the first day of the implementation of the patent, the number of applications for patents reached 3,455, praised as a new record in world patent history. We issued a first-day application commemorative card for patents applied for on the first day. After we received and processed the patent applications, we immediately set to work registering, categorizing, and examining and approving them, on 10 September of that year announcing the first group of 150. From this point, China has begun to have its own patent documents. In accordance with the patent law, for 3 months after issuance anyone can challenge, and if there is no challenge or if the challenge could not be substantiated, the patent would then be issued. Adding the 15 days travel time required by law, on 26 December the first group of patents had been determined, 143 in total. We held a patent certificate issuance ceremony for the first group, and the challenges received after the announcement were fairly normal, some 8 percent, which was in keeping with the normal rate for challenges throughout the world.

Second, the volume of applications has been rather stable and the composition is fine. After the first-day rush, the volume dropped quickly to a stable level, about 40 per day. There has been a slight increase this year, reaching 50 and sometimes 50 to 70, but maintaining a stable climb. By 21 June of this year, 22,285 applications had been received, among which 12,411 were for

invention patents, or 55.7 percent; there were 8,949 applications for new-use patents, or 40.1 percent, and there were 925 industrial design patents, or 4.2 percent. In addition, there were 14,915 domestic applications, or 67 percent. There were 7,370 foreign applications, or 33 percent.

Third, the patent law has begun to function as a stimulus for technological advancement. Among those applications already handed in, a group of the better technology items include energy conservation installations, energy conserving electricity generators, energy conserving switches, new materials, and new medical machinery, as well as new technologies and new types of instruments and equipment for improving environmental protection. There is also a group of better items in Jiangsu. As I am told by comrades in the Jiangsu Patent Management Office, 166 items have already been implemented, and the substitution of silver in applications where it does not create negative public externalities in itself, if it were applied throughout Jiangsu could result in a savings of 25.8 tons of silver and 2 million kwh of electricity. The newspapers have printed reports on the 4 patents for energy-saving burners by just Yan Mengqiu [7346 1322 4428] himself, which have been disseminated throughout 22 provinces and cities, including Tibet. Or the Northeast Academy of Chemical Engineering non-precious alveolated burning liquid catalyst technology, which is used in place of the precious metal catalysts in current world use, but the cost for which is 90 percent less than the precious metal variety. Currently, 2 million have been ordered, and contracts which have already been signed can generate \$2 million. For some inventions the economic and social results are outstanding and there has been a quick response from abroad. Over the last year, we have handled 140 patent applications from abroad, which is a new step for this country to take into the international arenas of technical and economic fields.

Fourth, it has received good evaluations internationally. After Chinese patent law was proclaimed, it was highly respected abroad, where it was considered that Chinese patent laws are good laws, they are simple and clear, are acceptable, and the evaluation has been positive.

The implementation of patent law has been the efforts of a new reform where we have stressed that we would open up the situation with conscientious efforts, that we would pay close attention to quality regarding the two items of application and evaluation and approval, that we would take as goals the optimizing of the two functions of data exchange and compensated transfer of the rights to technology, both under legal protection, and that we would arrange in full for all implementation efforts. Our preparations for implementation included the following aspects:

First, we formulated all the rules and regulations for implementation. Jiangsu has drawn up six rules and regulations in accordance with conditions in the province, including "Detailed Rules and Regulations Regarding the Implementation of Patent Law," a patent application guide, an administrative program for patent management, a guide to categorization, examination criteria (draft), patent fee collection standards, "Methods for Chinese Units or Individuals to Apply Abroad for Patents," and "Methods for Preservation of Microorganisms Used in the Patent Process." A series of implementation rules and regulations important to ensuring the smooth implementation of patent law.

Second, establishing a national system for patenting. In accordance with the notice approved by the State Council regarding setting up patenting organizations throughout the country, our patent system has been erected within a rather short time. At present, all areas and sectors of the country have established some 94 offices of patent management and patent management sections, 3 organizations for representation abroad, 245 domestic representative organizations, and there are more than 7,000 agents who have preliminarily established an agent system. In addition, 62 sites have been established for the distribution of Chinese patent documents.

Third, the publicity regarding initiation of the patent law and the training of patent personnel. We have published the Chinese patent law and detailed Chinese and English texts. Abroad, we have translated these into French, German, Japanese, Spanish, and Hungarian, which through broadcasts, television, and news agencies have been publicized both within and outside this country in 38 languages and 4 Chinese dialects to explain the Chinese patent law. We have held several hundred separate learning classes on patenting, have preliminarily trained approximately 10,000 people who are knowledgeable in the areas of law, examination, approval, management, representation, and document retrieval.

Fourth, we have developed international exchanges and cooperation regarding patents. We have at present established exchange and cooperative relations with the patent offices of more than 10 countries, such as West Germany, and with the European Patent Office and the World Organization for Property Rights to Knowledge. With the approval of the standing committee of the State Council, we have entered into the "Paris Treaty for the Protection of Industrial Property Rights," which has allowed the linking up of Chinese domestic industrial property rights protection with industrial property rights protection abroad.

At present there are still the following areas that do not yet suit the requirements of patenting efforts:

First, there has not been enough publicity about the patent laws, especially patenting regarding the opening of enterprises. In the past, we paid too little attention to this, and patent applications coming from enterprises have been only a little more than 10 percent of domestic applications. This is quite different from the situation abroad. Foreign enterprises usually see the number of patents they own as being an indication of their level of technology. Whether or not the patent system is able to solidify and effectively develop is still dependent upon enterprises, for not only do enterprises have great potential for making patent applications, but patent enforcement is largely through enterprises. For example, there are more than 300 people in the patent departments of Hitachi, Matsushita, and Toshiba. Matsushita considers the number of patent applications and rationalization proposals as one of the checks on affiliate enterprises. Therefore, publicity regarding the patent laws is very important, and is one of the guarantees of whether patenting can keep up an uninterrupted development.

Second, the onerous task facing information handling. Patents are information about public inventions and creations under the protection of law. The China Patent Office is currently publishing over 10,000 patent applications each year. There can be as many as 700,000 documents on the newest patents in the world exchanged with foreign offices, and how this information is to be handled to serve both within the office and outside it is very important. Currently, the patent offices of the United States, Japan, and Europe plan to develop paperless patent applications, where computer output would be used for an application, both for publication and for databases. Information processing is developing quite quickly, and the patent laws of this country are modern patent laws. If our methods of implementation are backward, this would be sure to affect enforcement of the law and the role of patents.

Third, the working system is yet incomplete and must continue to improve. We must pay attention to new problems, including the fact that the patent laws themselves do not completely suit the development of science and technology in this country. We must continue to make advances and gradually form a patent system with Chinese characteristics.

II. Regarding the opening up of technology markets

In putting patents into effect we have on the one hand done that ourselves and on the other hand have permitted others to do so. Many go through the technology markets, and therefore the opening of the technology markets has been an important problem in patent implementation. A few ideas are discussed below:

First, with the increase in the number of approved patents, licensed trade in patents will gradually form the main body of technology trade.

There are primarily three types of technology trade: 1. licensed trade in patents and trademarks under legal protection; 2. licensed trade in the secrets of technology under contract protection and licensed trade of foreign patents (if not Chinese or foreign patents, there is only contract protection); 3. general technical consulting and commissioned design, for which technical fees must be paid. In international technology markets, licensed trading in just patents is about 20 percent of volumes, licensed trading in combinations of trademarks and technology secrets is from 50 to 60 percent. This is to say that from 70 to 80 percent of technology trade is the licensed trading of patents in one way or another, and therefore the opening of the technology markets is something we consider to be an important link in keeping up with patents.

Second, under patent protection and with the participation of China in the "Paris Treaty for the Protection of Industrial Property Rights," domestic technology markets will be closely linked with foreign technology markets.

Some of the inventions and creations from abroad for which patents are requested will enter the domestic technology markets of this country, and at the same time some of the inventions and creations from this country will also seek patents from abroad, which will open up the international technology markets. In applying for patents abroad, one must choose one's items

carefully, must look into the technology market, must have the ability to do this, and must avoid doing so blindly.

Third, the major goal in opening up technology markets is to allow the achievements of intellectual labor to be transformed into production forces.

The transformation of inventions and creations into production forces is a social production process that can lead to many problems, which if not well resolved keep the implementation from occurring. Therefore, the process of circulation in the technology markets must be closely integrated with the production process that implements the patent.

Fourth, we must take control of characteristics of patented technologies themselves.

Patented technologies undergo examination and approval primarily to prove that they are the newest inventions and creations in the world. Therefore, it is possible that some will have stronger competitive capabilities. But the newest inventions and creations are certainly not necessarily the best inventions and creations, nor are they necessarily the most practical inventions and discoveries. For these reasons, the adoption of patented technologies should be done carefully. For different patents, the degrees of reliability are also not the same.

Fifth, our current use of new technologies is most active among the town and township enterprises, the advantage to which is that the markets are quite broad-based, but their abilities to accept that technology are weaker. We have at present several technology transfers that are progressing slowly. One reason is that when the price is too high, it cannot be sold. But some have been successful. The Beijing Information Center investigated a technology for the production of sugar from sweet potatoes. The price for this was reasonable, but as it gradually decreased in time, this technology was sold in all to more than 40 firms. Therefore, there are still some theoretical problems in technical and economic aspects as the technology markets are opened. There are four factors that should be considered in the calculation of technology pricing: one is cost, a second is results, a third is a comparison of market prices for a similar technology, and a fourth is the ability of the market to accept it. Regarding the results from a patented technology, there should be a careful investigation and analysis of conditions in all areas, and it is very important to be on top of reports and information.

Sixth, fully utilize the public nature of patents to break through technical barriers. One should not be solely concerned with the inventions and creations of just a particular province or city, but should be aware of the patented technologies that have been made public throughout the country. One should have courage and resourcefulness, should not be restricted by barriers, should break through these things and find ways to bring in those things that are needed and are good. Patents create the conditions for this.

NATIONAL DEVELOPMENTS

PATENT CONSIDERATIONS IN SCIENCE MANAGEMENT WORK REPORTED

Beijing BEIJING KEJIBAO in Chinese 1 Oct 86 p 1

[Report by Hao Meifang [6787 2734 5364]: "Beijing Includes Patent Work In Its Science and Technology Management System"]

[Text] Reporters have learned that beginning this year, because this city has included patenting within its science and technology management system, the patent effort has developed dramatically in each district, country, office (corporation), higher institution, research academy and institute, and large scale factories.

Since the propagation of the patent laws on 1 April 1985, the number of patent applications and patent approvals in this city have continued to rank at the top of those throughout the country. To allow these patented achievements to be transformed as quickly as possible into production forces and to further arouse the enthusiasm of inventors to apply for patents, the Beijing Municipal Science and Technology Leading Group issued notices requesting each unit to accomplish the following tasks:

1. In future science research and technology development efforts we should pay attention to the development of new technologies, new products, and new designs that are in keeping with the three characteristics of patents (originality, creativity, and applicability).

The notices request that from now on for each research and development topic newly selected by a unit, an investigation must be made into its originality. When selecting research topics, in technology concepts, and when designing and experimenting, all units should be fully aware of the technical information and market economic information to be included within patent documentation, for scientists and technologists must constantly adjust the directions, plans, and progress of research and development in accordance with patent information and its feedback.

2. For everything that fits into the three characteristics of patents and is also in keeping with the invented creation of the patent applied for, a patent application should be arranged, after which should be arranged the achievement appraisal, technology transactions, application awards, publication of documents, etc. For technical secrets that cannot easily be made public in

the near-term and that are appropriate for self-protection, there should not necessarily be an application for a patent.

3. It is hoped that each unit will actively organize efforts at patent implementation, for we are currently especially mindful of having the party providing the technology to be diligently responsible for implementing the technology guidance that is required to allow the technical achievements that have been provided in stages to be able to reach the technical and economic indices in accordance with contract provisions. In keeping with the requirements for technical advances, each enterprise should actively assimilate and use applicable patented technology and technology for which patents have been applied.

The notices require that each unit respect and support the implementation of patented technology that has a clear prospect of usefulness and economic results, but that also has a certain measure of risk. Only by a reasonable determination of a transacted price for patented technology, can the supplying and receiving parties coordinate and cooperate, allowing those patented technologies with clear prospects of usefulness to be put into operation as quickly as possible, thereby forming production forces.

4. For new technologies and new products that have a clear prospect as foreign technologies, patents should be promptly applied for to those countries as necessary before exporting patented technology. This will avoid the forfeiture of priorities.

5. Within half a year, each unit should everywhere publicize patent knowledge once, to instill in each scientist and technician the concept of doing science research in accordance with law, to allow them to learn to use the law to protect their own scientific and technical achievements, and to respect the scientific and technical achievements of others. Leading cadre at all levels should learn to use legal means to manage science and technology, and as examples of doing things in accordance with science and technology laws.

12586
CSO: 4008/2024

NATIONAL DEVELOPMENTS

TECHNOLOGY PATENT SITUATION DESCRIBED

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 8 Nov 86 p 1

[Report by Li Dejin [2621 1795 6855]: "Patented Technology in This Country Draws Respect Both Here and Abroad"]

[Text] As learned from the national conference on patent efforts held in Beijing beginning 7 November: Since Chinese patent law was implemented in April of last year, among the more than 2,000 technology applications that have been awarded patents, many have reached advanced world levels or have had high economic results. These items are not only respected by factories in this country, but are being implemented more and more; foreign firms are also interested, and in large numbers have sought to transfer the rights to technologies or to buy products.

The external (FAN BO [0646 2276]) device developed by Professor Zheng Zhensheng [6774 2182 5116] of the Zhongshan Medical Academy in Guangzhou is different from the "internal (FAN BO)" device developed abroad that can only be implanted by cutting the femoral artery because no surgery is needed. Also, changes in heart electric waves can be accurately traced in the (FAN BO) process, which is more effective for curing heart and cardiovascular diseases. Commercial interests from the United States and Singapore have requested to transfer the rights to this patent.

The "non-precious metal alveolate combustion catalyst" successfully developed by the Huadong Academy of Chemical Engineering substitutes clay, rare earths, copper, and manganese for precious metal catalysts. The cost is low, there is good performance, it has a long life, and has been welcomed in international markets. A contract has been signed with the United States to export 200,000 of them, and West Germany and Malaysia are also requesting to buy them.

The dissemination of patented technology has also achieved preliminary results within this country. According to materials from the two areas of Beijing and Shanghai, from 50 to 60 percent of those patents that have been approved have been purchased.

Li Peng, vice-premier of the State Council, has requested that closer attention be paid to the implementation of patented technology. He pointed out at a 7 November meeting that when the planning commission is examining and

verifying import projects, and when the economics commission is determining high technology topic selection or technologies to be disseminated, they should always make full use of patent information, giving preference to the consideration of using patented technologies. When enterprises are undertaking technology transformation and developing new products, they should also give preference to choosing patented technology.

Li Peng pointed out that "the final goal for implementing the patent system is to transform as quickly as possible the achievements of invention and creation into production forces, and the economic and social results from inventions and creations can only be implemented through production. Therefore, what we are more concerned about is not how many patents are applied for and approved, but how many have been implemented, and how much economic and social results have been obtained."

Li Peng also strongly emphasized that we are to enhance patent efforts for enterprises. He said that enterprise patent efforts are the basis of the patent system in this country, and whether enterprise patent efforts can smoothly establish and develop not only concerns the quantity and quality of patent applications, but will also concern the success or failure of the entire patent system. According to statistics, among the more than 18,000 domestic patent applications, only 13 percent have come from enterprises, nowhere near the number of applications from science research organizations and higher institutions. This shows that enterprise leadership has yet to include patent efforts on its agenda. Li Peng hoped that the dozens of enterprise representatives attending the conference would, upon their return, mobilize the patent efforts in their enterprises. He said that only if enterprises can understand patents and are good at applying patents can they avoid repetitious research that is of a low level. They should rely on technology advantages to be victorious in competition.

Before the conference, Li Peng also viewed the first exhibition of patented technology.

12586
CSO: 4008/2019

NATIONAL DEVELOPMENTS

ADVANCES IN CHINESE AIRCRAFT PRODUCTION NOTED

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 5 Nov 86 p 1

[Report by Gao Xiaoxing [7559 1420 2502]: "Development of Our Military Aircraft Enters a New Era"]

[Text] Wang Mao [3769 2510], vice-minister of the Ministry of Aeronautical Industries, recently disclosed to this paper that the development of military aircraft in this country has gone past the stages of drawing up and modeling to enter a new historical era.

This vice-minister, who has been decorated as a "heroic test pilot," led a delegation in September this year to an international aeronautics exhibition held in England. He went on to explain that when on this occasion China presented 11 military and civilian aircraft and guided missile models, which constituted a number of different products and a complete series, that reflected the production scale and overall level of the aeronautics industry in this country, and surprised those abroad. The Chinese designed and developed F-8 II all-weather, high altitude, high-speed fighter was even more eye-opening at the exhibition. This shows that China's design contingent has a particular strength.

When asked about foreign reaction to the Chinese participation in the exhibition, Wang Mao said that in the past we were not understood, but that seeing this exhibition foreign interests universally realized that technical cooperation with the Chinese aeronautical industry could be reliable and that China is a market that is very competitive.

Wang Mao said that if the Chinese aeronautical industry is to take great steps forward, the key will be in laying a good foundation. At the same time as we promote the restructuring of the science and technology system, we must focus on the major models and topics for development in the 1990's and strive to attain certain relative superiorities within limited goals. At the same time we should earnestly take control of efforts in management of systems engineering and excellence of quality with existing models of aircraft, and greatly enhance the technical bases for standards, measurements, intelligence, and achievement management. We should make the most of conditions from the current open-door policy and actively and broadly undertake international cooperation to improve our starting points.

This vice-minister emphasized that we must have a conceptual renewal. We cannot return to that time of the past in which we relied only upon one country, one firm, to monopolize aircraft design and development. We will strengthen international cooperation, make the most of advantages, and seek paths for development of the aeronautics industry that spends less money, is short in turnaround, and is less risky.

He pointed out that if China is to reduce the gap between it and advanced world levels, it must begin its efforts in the areas of aeronautical techniques and materials. The contracting production of aviation parts and components that we are currently undertaking with foreign interests is one shortcut. As for example where the Xian Aircraft Company is manufacturing aircraft vertical stabilizers for the American Boeing Company and where the Shanghai Aircraft Manufacturing Plant is making hatch doors for the main landing gear for the McDonnell-Douglas DC-9 Super 80, the results of which have been fine. It is estimated that the gross value of accumulated signed processing contracts exceeds \$100 million. This not only earns foreign currency for China, but also improves the level of aircraft manufacturing technology in this country.

Finally, Wang Mao pointed out that the export picture for Chinese civilian aircraft is very promising. Next year, China will strive to participate in the Paris Air Show with the actual aircraft, and will also present a group of accessory products that are up to standards.

12586
CSO: 4008/2018

NATIONAL DEVELOPMENTS

JIANGSU, MINISTRY OF ASTRONAUTICS COOPERATION REPORTED

Shanghai XINHUA RIBAO in Chinese 23 Oct 86 p 1

[Report by Hua Yaolin [5478 5069 2651]: "Ministry of Astronautics Carries Out Long-Term, Full Scale Economic and Technological Cooperation with Jiangsu Province"]

[Text] A signing ceremony for a letter of agreement between the Ministry of Astronautics and the Jiangsu Provincial People's Government for economic and technological cooperation was held yesterday afternoon in Nanjing. Minister Li Xue [2621 4872 6759] and Governor Gu Xiulian [7357 4423 5571] signed their names to the letter of agreement, and Lieutenant Governor Yang Yongyi [2799 0737 3085] and responsible persons in pertinent departments of the ministry and the provincial government participated in the signing ceremony.

The Ministry of Astronautics has comprehensive science research and production departments that are technology intensive, complete in disciplines, and have a full complement of specialties, and there are also departments of rising new industries where optics, mechanical, and electronic techniques and technologies are brought together. The town and village economy in Jiangsu Province is rather developed, and is very attractive to new technology. To promote the restructuring of the economic system, further implement the policies of "military-civilian integration," advance the integration of space sciences and technology with the economy of Jiangsu, and develop the national economy, leading comrades of the Ministry of Astronautics and Jiangsu Province have determined through discussions that the ministry and province will carry out long-term, full scale economic and technological cooperation.

The agreement provides that the Ministry of Astronautics and Jiangsu Province will develop economic and technical cooperation in the areas of the technological transformation of traditional industries, automation of production processes, reprinting for assimilation major import projects and major technological problem solving, as well as the development of light industries, electromechanics, energy resources, building materials, transportation, and communications. In the transfer of rights to new technologies and new products, preferential conditions are created for the receiving party and they are provided with excellent service. For new technologies and new products developed cooperatively by the two parties, these should be included in particular science research and production

planning with precedence for arranging trial-production and production. In the near-term, there will be broad-based cooperation in the areas of supermicrocomputer development, special project construction for provincial economic information management systems, the nationalization of manufacturing equipment for color picture tubes, the development of new types of textile printing equipment, the development and trial-production of electronic medical appliances, applications of heat pipe technologies, machinery for environmental hygiene, special motor vehicle refitting, and development of basic parts for machinery. Both parties join in promoting economic and technological associations between enterprises and causes of the Ministry of Astronautics in Jiangsu and local Jiangsu enterprises. These will form enterprise blocs to develop electromechanical products that are technology intensive and needed by the nation. The ministry and province will provide support by taxing the transfer of rights within a certain time and by reducing taxes.

At the same time, the Commission for Economic and Technological Cooperation Between the Ministry of Astronautics and Jiangsu Province was established, with Ministry of Astronautics vice-minister Cheng Lianchang [4453 6647 2490] and Jiangsu Province Lieutenant Governor Yang Yongyi as chairpersons of the commission.

12586
CSO: 4008/2018

NATIONAL DEVELOPMENTS

FUJIAN SCIENCE ASSOCIATION CONVENTION REPORTED

Fuzhou FUJIAN RIBAO in Chinese 2 Nov 86 p 1

[Text] Yesterday afternoon, the Fuzhou Xihu theater was packed full with the flavor of spring. The 3d congress of the Fujian Province Science Association opened solemnly here. The outstanding scientists and technicians who had come from everywhere in the province gathered happily under the one roof, determined to contribute their talents and knowledge to implementing the seventh 5-year plan and to making the economy of Fujian prosper.

Those who presided over the conference today included Kang Beisheng [1660 0554 4563], Ni Songmao [0242 2646 5399], Lu Haoran [4151 3185 3544], Tian Zhaowu [3944 2507 2976], You Kuanzhou [3266 1401 3166], and Lu Weite [7120 4850 3676]. Kang Beisheng presided over the opening ceremonies. Zhao Xiufu [6392 0208 1788] gave the opening speech.

Those attending the opening ceremonies were leading comrades of the provincial science and technology commission, the provisional advisory committee, the provincial discipline commission, the standing committee of the provincial people's congress, the provincial government, the CPPCC, and the provincial military district, among whom were included: Chen Guangyi [7115 0342 3015], Hu Ping [5170 1627], Jia Qinglin [6328 1987 2651], Hu Hong [5170 1347], Cheng Xu [4453 1645], Yuan Gai [5913 2395], Gao Hu [7559 5170], Cai Ninglin [5591 1337 2651], Yuan Qitong [5913 0796 1749], He Shaochuan [0149 1421 1557], Wen Fushan [3306 7096 1472], Wang Yan [3769 3508], Guo Ruiren [6753 3843 0086], Wang Zhi [3769 4160], Liu Yongye [0491 3057 2814], Hou Linzhou [0186 2651 5297], Cai Liangcheng [5591 5328 2110], You Dexin [3266 1795 7451], Huang Changxi [7806 7022 3305], Chen Binfan [7115 1755 5672], Chen Xizhong [7115 1585 0112], and Zuo Fengmei [1563 0023 5019].

Chen Guangyi represented the provincial Party committee and the provincial government in warmly welcoming the convention. In his speech he fully affirmed the work of the provincial science associations over the past 5 years and the contributions made by scientists and technicians. He hoped that the comrades at the frontlines of science and technology will earnestly and thoroughly study the resolutions of the 6th Plenum of the 12th CPC Central Committee regarding guiding policies for the building of a socialist spiritual culture. He hoped that they will thoroughly understand the essence of the spirituality, will take control of fundamental directions, and will self-consciously use the spirit of the "Resolution" to guide and develop each

activity of the science associations to better serve the opening up, the reforms, and economic construction, and to realize contributions of talent and knowledge to the goals for struggle during the seventh 5-year plan.

In his speech, Chen Guangyi brought up four expectations for science association organizations and for scientists and technicians at all levels:

1. He hoped that science association organizations at all levels will take on the historical mission of popularizing science and technology and strive to improve the quality of science education for people throughout the province. The fundamental task for building the socialist spiritual civilization lies in fostering citizens with the "four haves" and in improving the quality of ideological morality and quality of science education for all the peoples of China. To this end, the energetic popularization of science and technology constantly improves the level of science and technology education and knowledge for the people as a whole. This is the strategic mission of the entire party, and is also the glorious historical mission of scientists and technicians.

Science and technology are production forces. We want to be certain to establish ideology that is based upon progress in science and technology. We want to expend great effort and mobilize strength in all areas in developing the popularization of science and technology. First, his popularization should be oriented to the four modernizations and advance the development of economic construction. Second, it should be oriented to the public, be founded in an improvement in the level of scientific and technical education as a whole, and continue to broaden the fields for science and technology popularization. This popularization should begin with elementary education. Third, it should be oriented to aiding the poor, to helping impoverished areas change their situation. Fourth, it should be oriented to society to advance the renewal of concepts. We should adopt various vivid forms by which to publicize science knowledge and the spirit of science to the public, to declare war on feudal superstition, ignorance and backwardness, and bad customs and habits, and propose the modes for a life that is part of a healthy civilization and science.

2. He hopes that the science associations at all levels and the many scientists and technicians will strive to meet the demands of the opening up and of the reforms, and that they will actively develop scientific and technical cooperation and exchanges both within and outside, which will promote scholastic prosperity in the province and progress in technology. Fujian is located on the southeast coast, neighboring Taiwan and Hong Kong and Macao, and overseas Chinese and those of Chinese ancestry from this area are spread throughout all regions of the world; with the open-door policy, the central authorities have granted us special policies and flexible measures. This is a great advantage to this province for the invigoration of our economy and for developing the cause of science and technology. This requires that we not only greatly enhance our building of science education and our broad initiation of domestic exchanges of scientific culture, but also that we fully utilize the advantageous situation of this province in regard to cultural exchanges abroad. It requires that the science associations actively carry on scientific and technical cooperation and exchange through multiple channels

and formats with foreign scholars and specialists, with scholars and specialists who are overseas Chinese or of Chinese ancestry, as well as scientists and technicians from Hong Kong, Macao, and Taiwan. This will allow this province to truly become a "window" on foreign scientific and technical cultural exchanges. At the same time, this will respect the policy whereby science and technology is oriented toward economic construction, will mobilize the many scientists and technicians to actively develop the absorption and assimilation of and innovation on important new technologies, to work together, to cooperate in solving problems, and to make more contributions to the prosperity of Fujian economic construction.

3. He hopes that the many scientists and technicians will actively mobilize research and consulting to participate in the different levels of all construction and reform going on in this province. He hopes that they will make full use of the positive role of democracy and of the process of science in leadership decision making at all levels.

Bringing democracy and science to decision making is one of the important topics of the reform of the political system in this country. Leaders at all levels of the Party and of government should fully arouse the enthusiasm of the many scientists and technicians to allow them to truly make the most of their intellectual, planning, research, and consulting roles in the decision making process. All kinds of science associations and the societies and study groups associated with them should make use of various means, and those good at organizing and guiding the many scientists and technicians should focus on the major topics relating to the economic invigoration of this province, progress in science and technology, and the development of society to provide consulting services to all pertinent departments and units and for party and governmental leaders at all levels. They should also be good at understanding developing trends in the soft sciences both here and abroad. The beneficial experiences absorbed in all these activities will continue to improve the qualities and levels of consulting services.

4. He hopes that science associations at all levels will continue to serve as nodes, serving to unite people in scientific and technical circles throughout the province, which will bring a shared struggle to new aspects of science and technology in this province. Through their dependable, detailed work, science associations will create a democratic and harmonious atmosphere in which everyone will join together, and the enthusiasm of each person will be fully motivated to contribute even more to socialist construction; through appropriate measures, they will help scientists and technologists to renew their knowledge and to strive to improve their own ideological morality and the quality of their education and science; they should respect and make the most of the important function of scientists from the previous generation, at the same time earnestly creating the conditions whereby the younger generation of scientists and technicians appear in great numbers to be employed as the new generation of scientists and technicians. In these things lie the keys to victory through knowledge and the prosperity of Fujian's hopes.

Chen Guangyi said that on the occasion of this convention, scientists of Fujian citizenry from all over the country and from Hong Kong and Macao have come to participate, which is an excellent beginning. We hope that in the

future even more scholars residing abroad and scholars from Taiwan will come to Fujian to lecture and carry out scholastic exchanges. This will allow for the uniting of scientists and technicians on both sides of the straits and from near and far, all to make new contributions to the unification of the motherland and the prosperity of the economy.

Finally, Chen Guangyi said that party commissions and governments at all levels must respect knowledge, must respect intellectuals, and must do more realistic service for the achievement of scientific and technical reserves. They should respect and make the most of the functions of the science associations by actively supporting a broad initiation of activities by the science associations and earnestly helping to solve some basic problems. In keeping with the demands of the slogan "orient towards modernization, the world, the future, and don't practice fraud, but do more practical things," science associations at all levels should unite in struggle, open up and progress, and should strive to develop new aspects for science and technology in this province.

An honored member of the Chinese Science Association, Pei Lisheng [5952 7787 3932], made a special trip to Beijing to attend the opening ceremonies, and also spoke.

Also sitting at the presidium were the well-known scientists and technicians from Hong Kong and Macao, Huang Baoxin [7806 0202 2946], Huang Yihong [7806 1355 1738], Du Zuyi [2629 4371 6318], Hu Xiaosheng [5170 1321 4939], and Jin Yaoru [6855 1031 1172], and regional citizens currently scientists outside the province, such as Lu Peizhang [4151 0160 4545], Min Guirong [7036 2710 2837], Shi Meixin [4258 5019 9515], Chen Keji [7115 0668 0370], Chen Chuan [7115 2796], and Liu Xiashi [0491 1115 4258].

Leading comrades of the provincial Federation of Trade Unions, provincial committee of the Communist Youth League, the provincial Women's Federation, the provincial military command, the provincial literary federation, the provincial federation of social scientists, the provincial federation of Chinese living abroad, and the provincial friendship federation of Taiwan compatriots all read congratulatory messages at the convention.

Leaders of the Guangdong science associations represented guests attending the meeting from fraternal provincial or city science associations in giving speeches.

Science associations from the provinces or cities such as Shanghai, Anhui, Shandong, Zhejiang, Jiangxi, and Guangdong and some Fujian citizens working as scientists and professors outside the province sent congratulatory telegrams and messages to the convention.

Before the meeting opened, leading comrades and representatives of the provincial party, government, and military posed with guests in a commemorative photograph.

12586
CSO: 4008/2024

NATIONAL DEVELOPMENTS

GUIZHOU KARST STUDIES REPORTED

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 27 Nov 86 p 4

[Report by Yang Xiling [2799 6932 3781]: "Guizhou Science and Technology Commission Implements Science Research Open-Door Policy; Broadly Solicits Talent to Develop and Bring Karst Areas Under Control"]

[Text] Guiyang, 26 Nov (XINHUA)--The Guizhou Provincial science and technology commission has opened up science research and is broadly soliciting talent to provide a scientific basis for the large-scale comprehensive development and control of karst mountain areas.

Some specialists and professors from all over were recently invited to Puding County, site of the first comprehensive karst experimental station in this country, to conduct research on the topic "Comprehensive Management of Karst Water Resources and Small Drainage Areas in Southern Puding" together with karst specialists from Guizhou.

Karst is widely spread throughout Guizhou Province, occupying more than 70 percent of surface area throughout the province, the highest in China. Because of abundant karst formations, with fissures and caves running back and forth, so much surface water seeps below ground that in many places there is a serious lack of water. Puding County is the major karst research area in the country, and Guizhou Province has taken some measures to provide initial experience for this karst mountainous region in shedding poverty and attaining wealth, which has received public praise from the region.

Personnel from the Guizhou Provincial Science and Technology Commission explained that the topics selected for this occasion are quite difficult and would be difficult to accomplish by sole reliance on the science research strength of Guizhou Province. Opening up science research is advantageous to the nation, the region, and to science research personnel.

12586
CSO: 4008/2024

NATIONAL DEVELOPMENTS

SCIENTIFIC RESEARCH, PRODUCTION COOPERATION IN HEBEI DISCUSSED

Beijing KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT] in Chinese No. 4, Oct 86
pp 61-64

[Article by Liu Xibo [0491 1585 0130] of the Hebei Provincial Science and Technology Commission: "Depend on Each Other for Common Development; Vigorously Promote Cooperation Between Scientific Research and Production"]

[Text] In the past few years, the provincial CPC committee and provincial government have taken a strategic measure of making full use of the technological superiority of the key cities (particularly Beijing and Tianjin) for Hebei's economic development. Accordingly we have worked through many channels and from different approaches to explore ways of cooperation between scientific research and production. In the course of development from temporary technological cooperation to the formation of technological and economic partnerships, notable social and economic results have been produced. At present, cooperation is developing from elementary to advanced forms, short to long terms, and loose to close relation, and is spreading from a few localities to urban and rural areas throughout the province. Now nearly 800 research institutes and universities and colleges in and outside the province are cooperating with production units on technological development, demonstration, and popularization projects, and more than 30,000 scientists and technicians are participating in the activities. Some 1,200 long-term, fixed research-production partnerships have been established in the province. Practice has shown that this kind of cooperation is an effective way to integrate scientific and technological development with a economic growth.

I.

There are three main forms of cooperation between scientific research and production in Hebei Province.

1. Scientific research units, universities, and colleges undertake research on key production technologies or the development of new products in cooperation with production units. Priority is given to local use of the research results. This is the common form of cooperation in the province. According to statistics, of the 722 development research projects in provincial science and technology plans from 1982 through 1985, 253, or 35 percent, were

undertaken jointly by production units and scientific research or educational institutions, and 26.56 million yuan, or 52.9 percent of the total investment under the provincial science and technology plans, were spent on the joint development research projects. Of these cooperative research projects, 76, or 30 percent, were undertaken jointly with units in other provinces. Of the 721 research results which won provincial awards during 1982-85, 321 or 45 percent, were the results of projects jointly undertaken by scientific research and production units. This form is not only urgently needed by small and medium-size enterprises but well received by large enterprises with relatively strong technical staffs. For example, the (pingyang) mycin, an antibiotic against tumors, winner of a second-class state invention award, was developed jointly by the North China Pharmaceutical Plant, the Chinese Academy of Medical Sciences Antibiotic Institute, and the Tianjin Hebei Pharmaceutical Plant. This kind of cooperation at a higher level is conducive to concentrating a superior force to surmount difficult technological problems.

2. Scientists and technicians from research units, universities, and colleges in and outside the province are organized to work with local people in multiple-subject, long-term efforts to solve key problems and carry out the comprehensive technological development of key areas.

The Taihang Mountain area with 25 counties and 8.16 million people accounts for 24 percent of the total area and 15.5 percent of the total population of the province. The area has abundant natural resources but was economically backward, with a per-capita income of less than 50 yuan in 32 percent of the villages. To change the impoverished face of this old liberated area, we organized more than 600 scientists and technicians from the Hebei Agricultural University and elsewhere in the province to go to the mountain area in 1982, where they led more than 1,000 peasant-technicians and more than 34,000 technical demonstration households in launching a technological development program. In the past 2 years, we have invited more than 800 experts and scientific and technical personnel from more than 200 research institutes, universities, and colleges in other provinces to the mountain area. A mighty army of scientists and technicians from in and outside the province and among the peasants was formed to embark on large-scale experiments and demonstrations in many specialized fields for the comprehensive development of the Taihang Mountain area. By now, 34 major research results have been achieved and disseminated to two-thirds of the townships and villages. The ecological environment and production outlook have begun to change in the mountain area. Total agricultural output value has increased year after year. In 1984, total agricultural output valued increased to 3.12 billion yuan, double that in 1981, and per-capita income was 250 yuan, five times that in 1981, and was expected to reach 300 yuan in 1985.

The Heilonggang area with 45 counties and cities accounts for 17.7 percent of the total area and 26 percent of the total population of the province. The area used to suffer serious damage from drought, water-logging, and saline-alkali soil conditions. Output was low and unstable. Per-capita annual income was only 66 yuan. Since 1983, we have brought more than 2,700 scientists and technicians from more than 50 research institutes, universities, and colleges in and outside the province to the area. Together with nearly

10,000 local peasant-technicians, they have launched more than 20 experimental projects on a 5.4-million-mou development area, carried out comprehensive farmland improvement, commodity production, and technological development plans, and popularized and put to use 36 advanced applied techniques. The area's production outlook has begun to change, and economic structure is being readjusted. Compared with the 3-year average before development, per-unit area yield of various crops increased by 50 percent to 130 percent. Per-capita income was expected to reach 350 yuan in 1985, five times that in 1982.

3. Research units, universities, and colleges enter into partnerships with production units with fixed technical and economic relations.

Set up under mutual agreements or contracts which last several years, these kinds of partnerships go farther than the one-time or single-project technical-cooperation arrangements. There are mainly three forms of partnerships. First, research units, universities, and colleges enter into joint ventures with enterprises, contributing shares in the form of technologies and new products, providing technological guidance, and sometimes investing some equipment and money. The enterprises are responsible for production and management. Profits are divided between the two sides. Second, research units set up joint ventures with small enterprises or town and township enterprises, using the latter's plant facilities to carry out intermediate experiments and industrial production of new products. The research units are responsible for technical training and guidance. The two sides share the management and divide the profits. Third, large and medium-size enterprises or town and township enterprises for the manufacture of their products. The former provide production technologies as well as some equipment and raw and semifinished materials and have exclusive rights to market the products. Profits are divided.

II.

Experience in the past few years has shown that the various forms of cooperation between scientific research and production are producing increasingly positive results.

1. They are conducive to implementing the principle that "economic development must rely on science and technology, and science and technology must serve economic development," integrating scientific research with production, and must shorten the period to turn technological achievements into productive forces. Because research units are eager to meet the needs of producers, they are becoming increasingly purposeful in choosing research projects. Priority is given to highly marketable new products and key technologies urgently needed by production units. Cooperation with production units in development research makes it possible to discover in good time technical problems in the trial-manufacture and production process of new products so that designs and production technologies can be changed and improved promptly. The close link between research and production greatly shortened the time for research achievements to be transferred from laboratories to production units. The Baoding City chemical industry research institute has formed partnerships

separately with the Wuji county chemical works and the Jize county hot pepper products plant. In just 6 months, they have successfully put into production and applied three new propyl acid binder products and research results on the multipurpose use of hot pepper. The new products are selling well in the market. In the past 2 years, the rate of application and popularization of research achievements in Hebei Province has increased from about 30 percent to about 80 percent, which is indicative of the progress made in integrating research with production.

2. They are conducive to developing quality products and increasing the competitiveness of enterprises. As the two sides of a partnership are closely bound together by common economic interest, the enterprise is enthusiastic about producing goods that are readily marketable, and the research unit is very concerned about the up-to-dateness, practicality, and market demand of products to protect the reputation of their research achievements. The enthusiasm of both sides merges into a common desire to improve product quality, which contributes to the establishment of a strict and effective quality control system. The steam flowmeter jointly developed by the Botou City instrument and meter plant and the Shanghai automation instrument and meter institute has won the State Economic Commission's "Golden Dragon Award" for new products and has been twice recommended by the State Economic Commission and the Ministry of Machine-Building Industry as a new product to be popularized nationwide.

3. They are conducive to transferring the superior intellectual resources of the research units, universities, colleges, and large enterprises, with their large number of scientists and technicians, to the technologically weak small and medium-size enterprises, town and township enterprises, and rural villages to solve the contradiction between the need to increase production and the lack of qualified people. At present, Hebei Province has recruited nearly 30,000 scientific and technical personnel from other provinces, about five times the number of scientists and technicians of the independent research units in the province. In 1984, the province brought in 3,500 research results from elsewhere, more than the total number of research achievements of the province in the previous 4 years. This kind of cooperation makes it possible for the scientists and technicians to work at the production units without losing their jobs at the research units. It is simple and practical, a breaking down of the longstanding "barriers between departments and areas" and "departmental ownerships." This transfer of intellectual resources is like "a welcome rain after a long drought" to the technologically backward production units and enables the scientific and technical personnel to give full play to their abilities in the production field like "fish in water." The scientists and technicians not only work on technological development projects but pass on knowledge and train local people. The more than 1,000 scientists and technicians taking part in the development of the Taihang Mountain and Heilonggang areas have trained 1.25 million peasant-technicians. This is the beginning of a technological force of locally born and raised peasants, and the knowledge structure is also changing in the countryside.

4.. All parties in a partnership will receive certain economic benefits. By developing readily marketable new products, a research-production partnership becomes more competitive in the market, and the result is greater economic returns for both partners. Since the Funing County machinery plant formed a partnership with the Beijing Agricultural Machinery College, it has developed and produced a series of feed processing equipment. From July 1984 to November 1985, the plant made a profit of 400,000 yuan on total sales of 1.41 million yuan. Before this, the plant had operated at a loss. So far, 61 development research institutes in Hebei have set up 210 research-production partnerships, and the income has contributed to their economic independence. Since the Shijiazhuang municipal building materials research institute set up partnerships with 10 town and township enterprises, its annual income has increased by 150,000 yuan, which account for 55.5 percent of its total technological income. The institute is now economically self-sufficient.

III.

The following are major practices and measures adopted in the province to promote cooperation between scientific research and production.

1. Actions at Every Level and on a Broad Scale

The provincial CPC committee and provincial government attach great importance to the introduction of technology and qualified people from outside the province, particularly from Beijing and Tianjin. In 1983, Comrade Zhang Shuguang [1728 2562 0342], governor of Hebei Province, held a special meeting in Langfang, between Beijing and Tianjin, calling on various departments at all levels and production units to open their doors, look for qualified people from everywhere, and invite universities, colleges, and research units in Beijing and Tianjin to come to the province to pass on technologies and promote cooperation between research and production. Subsequently the provincial science and technology commission proposed and laid out specific plans for "three transfers", that is, the transfer of technologies and qualified people from elsewhere, particularly Beijing and Tianjin, into the province, the transfer of technology and qualified people in the province to small and medium-size enterprises, town and township enterprises, and rural villages, and the transfer of technology and qualified people from the defense industry to civilian industries. At the provincial science and technology work conference held by the provincial CPC committee and provincial government in May 1985, the secretary of the provincial CPC committee and the governor both called for efforts to promote cooperation between research and production. Later, the provincial government called a provincial urban work conference, again stressing the necessity to establish the idea of "relying on Beijing and Tianjin and serving Beijin" to achieve "our own goals as well as common development." In the past few years, science and technology commissions at various levels, scientific and technical service organizations, and production enterprises have been looking for qualified people, technologies, and partners for cooperation. In some prefectures and counties, the principal party and government leading comrades took part personally in the search. Qiao Shizhong [0829 0013 1813], secretary of the Hengshui prefectoral CPC committee, paid a visit to Tianjin University and other units. The head of Jixian County invited experts and professors from Qinghua University to work at the Jixian

radiator plant, a township enterprise, and the rare-earth grey cast-iron high-pressure radiator they developed has been rated as a quality product by the ministry concerned and is selling well throughout the country. Of the nearly 30,000 scientists and technicians invited from outside the province, 20,000 are from Beijing and Tianjin. They have made important contributions to promoting cooperation between research and production and accelerating Hebei's economic development.

2. Investigations, Studies, and Forecasts

To find a scientific basis for closer technical and economic cooperation between Hebei Province and Beijing and Tianjin, we assigned a research project entitled "prospects and ways for the transfer of technology from Beijing and Tianjin to Hebei" to the provincial scientific and technological information center in 1982. They invited 58 experts from economic, planning, and science and technology departments, scientific research units, universities, and colleges in the province and in Beijing and Tianjin; conducted detailed investigations on the basic situation of economic development, conditions of natural scientists and technical personnel, and conditions of the research, teaching, and technical personnel of research institutes, universities, colleges, and secondary technical schools in Beijing, Tianjin to Hebei. The result of the research was fully affirmed by leading comrades of the provincial government. In the past 3 years, the ways for technology transfer suggested in the report have been adopted.

3. Grasping Typical Examples, Using Them To Lead Others

Hengshui Prefecture is a low-lying area with a saline-alkali soil. It was economically backward. However, the prefecture vigorously promoted cooperation between research and production. In a period of a year and more, it established technological cooperation relations with more than 100 research units, universities, and colleges in and outside the province, invited more than 1,000 scientists and technicians, and developed a number of key county and township enterprises. Seizing this typical example, we held an on-the-spot meeting in Hengshui in May 1984 to popularize their experience. In September 1985, we held another on-the-spot meeting in Baxian County to sum up and popularize the county's experience in bringing in 800 scientists and technicians, forming research-production partnerships with Beijing and Tianjin, and enabling its town and township enterprises to double their total income in 2 years. The practice of seizing one such advanced unit and spreading its experience each year is having a tremendous impact on the whole province.

4. Formulation of Policies To Promote Development

In July and August 1985, we conducted a special investigation on the development of cooperation between research and production in the entire province, and new problems were discovered. For example, some research units used immature technologies or products as technological investment in partnerships with enterprises, or asked enterprises to produce above plans regardless of market demands, causing waste in money and raw and semifinished materials. Some enterprises, attempting to keep more of the income for themselves, gave false operations and sales reports to the research units, adversely affecting the

consolidation and development of the partnerships. To solve these problems and promote the development of research-production partnerships in the whole province, we held a special discussion meeting in September 1985, attended by research units, production units, and prefectural and county science and technology commissions. The meeting discussed forms of partnerships, the obligations of each party, the principle of profit distribution, support policies, policies, and so forth and drafted a "recommendation on vigorously developing research-production partnerships" (already distributed throughout the province as a guidance document). To attract research units, universities, and colleges outside the province to form partnerships with production units in Hebei, we stipulated in regulations governing rewards for research achievements that a 30 percent increase should be made to the cash awards for out-of-the-province units on award-winning achievements of joint research projects. The stipulation has been in force for 2 years now.

5. Pooling Funds From Different Sources, Starting With Selected Counties

In 1985, we selected six counties with a relatively good work foundation as experimental counties for rural technological development to receive priority work guidance and financial support from the provincial science and technology commission. To raise development funds, matching allocations were made by the province, the counties, and the production units. The provincial science and technology commission allocated 1.05 million yuan for the six counties, the counties budgeted 1.67 million yuan, and production units raised 11.59 million yuan on their own. Thus a total of 14.31 million yuan was raised, and 66 "short-term, of appropriate level, and with quick results" development projects were started to equip town and township enterprises with science and technology. On these projects, 150 scientists and technicians were recruited from 65 universities, colleges, and research units to participate in development research, in some cases as research-production partnerships. In just a little over 6 months, 43 projects were completed, and most of the remaining projects should be completed before the end of the year. After all these 65 projects are put into production, they can generate 17.18 million yuan in increased profits and taxes. In 1986, 19 more experimental counties will be set up in different areas, including 7 in the mountain areas, 2 in the cold and high Bashang area, 7 on the plains, 1 in the coastal area, and 2 in minority nationality areas. It is initially planned to raise a total of 43.09 million yuan, including 2.15 million yuan from the provincial science and technology commission, 3.72 million yuan budgeted by the counties, and 37.22 million yuan raised by production units. Adding the 1986 investments by the other six experimental counties, poverty-support funds, and bank loans, the 25 counties will raise a total of 75 million yuan. Initial arrangements are being made for cooperation with research units, universities, and colleges on more than 280 joint development projects under the "spark plan." It is estimated that after completion, the projects will have an annual output value of more than 300 million yuan and increase profit and tax revenues by more than 87 million yuan. All funds allocated from the provincial and county budgets are to be repaid, and the funds thus collected will be put at the disposal of the county science and technology commissions. In this way, each county science and technology commission will have a science and technology development fund of between 300,000 and 500,000 yuan to be used in support of joint

research-production development projects. We plan to achieve major successes in the 25 selected counties in 1986 for demonstration to the whole province and will increase the number of experimental counties each year to continue to promote research-production cooperation.

12802/12951
CSO: 4008/2015

NATIONAL DEVELOPMENTS

LARGE TECHNOLOGY MARKET OPENS IN SHIJIAZHUANG

Shijiazhuang HEBEI RIBAO in Chinese 15 Oct 86 p 1

[Report by Xue Luying [5641 4389 5391]: "Hebei Science and Technology Building Holds Opening Ceremonies"]

[Text] At the south end of the provincial exhibition pavilion in Shijiazhuang, a cream-colored, hexagonal, 13-story building stands out, appearing majestic in the October sunlight. The phrase "Science and Technology Building" hand-written by Comrade Hu Yaobang and the "Hebei Science and Technology Building" hand-written by Comrade Fang Yi are even more eye-catching. Today, the opening ceremonies were solemnly held for this modern building.

Politburo member and member of the State Council, Fang Yi, cut the ribbon in the opening ceremonies for the Hebei Science and Technology Building. Provincial commission secretary, Xing Chongzhi, and Governor Jie Feng also joined in the ribbon cutting.

Before the opening ceremony, Comrade Fang Yi was accompanied by provincial leading comrades and personally met with scientists and technicians from this province. They were: Wang Jian [3769 0256], Xu Haiguang [1776 3189 0342], Li Donghui [2621 2639 6540], Chen Reimei [7115 3843 2734], Zhang Baoxiang [1728 5508 4382], Zhao Guozhong [6392 0948 1813], Chen Shuxi [7115 2562 2569], Su Zhihai [5685 1807 3189], Gao Gangsheng [7559 6921 3932], Kang Quguang [1660 0366 0342], Li Miaofu [2621 1181 4395], Wang Shikui [3769 0013 7608], Zhang Yunzeng [1728 5686 1073], and Lin Xianping [2651 3759 1627]. After listening to their opinions, Comrade Fang Yi said that if our cause is to flourish we first of all need talent, for without it we cannot flourish. Hebei is a valuable area and everyone should work well to build it up. Those who are younger should exert themselves to become strong; those who are older can be old but vigorous.

Governor Jie Feng spoke at the opening ceremonies. He said that at present the vast number of party personnel and cadre in this province are diligently studying and implementing the resolutions of the 6th Plenum of the 12th CPC Congress. In the overall arrangement of our socialist modernization efforts as determined by the 6th Plenum of the Party Congress, we must first do a good job at economic work in this province. In this we must rely upon science and

technology to promote the development of economic construction. The provincial commission and the provincial government require that science and technology during the period of the seventh 5-year plan is certainly to be done even better than during the sixth 5-year plan. The science and technology front throughout the province must resolutely advance the restructuring of the science and technology system. The many scientists and technicians must self-consciously implement the scientific and technical principles for this new period as determined by the Central Committee. They must perform in the main battlefields of science and technology, and diligently implement the "spark plans," and they must undertake key problem solving in science and technology, disseminating and applying scientific and technical achievements. They should actively open up hierarchical, multi-format technology markets, vigorously develop lateral technical and economic associations, and send advanced, suitable technology to urban enterprises and to the many people of the countrysides. This will allow the close integration of science and technology with economic construction, and will fully display the full power of science and technology for that economic construction. And it will push efforts in this province for building material and spiritual civilizations into a new stage.

Deputy director of the State Science and Technology Commission, Guo Shuyan [6753 2885 6056], also spoke at the opening ceremonies.

The Hebei Science and Technology Building was built with funds raised from various sources, and total area of the building is 26,500 sq m. Included are the main floor, the science and technology assembly hall, guesthouses, exhibition halls, and dining rooms. And there are special areas and advanced equipment for science and technology and new products trade fairs, for personnel exchanges, scholastic lectures, and technical training. It is a provincial level permanent technology market and technical training center, and is also one of the largest base areas in this country at present for scientific and technical exchanges and transactions, and for science and technology training. Its construction and operation creates excellent conditions for the cause of science and technology in this province and for promoting the fostering of talent.

12586
CSO: 4008/2019

NATIONAL DEVELOPMENTS

SHENYANG AREA TECHNOLOGY DEVELOPMENT PLAN ANNOUNCED

Tianjin JISHU SHICHANG BAO in Chinese 2 Sep 86 p 1

[Text] How can science and technology be integrated with economic construction? How can we build new types of science and technology management systems to serve the transformation of older industrial areas? Recently, the Shenyang city government proposed "A Plan for Integrating the Overall Transformation of the Tiexi Industrial Area and Conducting Experiments with Restructuring of the Science and Technology System." They have begun a "science and technology construction area" in the Tiexi industrial area and are conducting experiments on an omnidirectional restructuring of the science and technology system.

There are more than 400 factories and a group of science research academies in the Tiexi industrial area, which is the economic heart of Shenyang, and an overall transformation of it would be of great significance. The overall transformation of the Tiexi industrial area has been included among the major overall transformation projects during the period of the national seventh 5-year plan, which means that the state will provide a certain amount of funding. To allow the technology transformation, product renewal, equipment transformation, urban transformation, and the complete set of service facilities in the Tiexi industrial area to develop in the direction of modernization, and to allow products and technologies to attain levels of the 1980's, the Shenyang city government has decided that: within the industrial area, and beginning with science and technology, a complete transformation will be promoted to establish a new kind of modern industrial system.

In that "Plan" they have pointed out that first of all, they want to break up the current situation in which there is a creation of barriers and strict ownership by sectors, and arouse scientific and technical strength in all aspects to serve the transformation of the Tiexi industrial area and to establish a science and technology management system that is suitable to the Tiexi industrial area. To implement a technology responsibility system within the enterprises that is headed by a senior engineer will expand the autonomy with which factories run science research institutes and will make full use of the function of factory-run institutes. Second, they have drawn up technology market policies that are suitable to the transformation of the Tiexi industrial area, and have established technology consulting service structures and networks, and organized technology transactions of various sorts. Third,

they have organized and invited project technology specialists from science research units and higher institutions to participate in evaluations and demonstrations of major technology project items to be brought in for the transformation of the Tiexi area. Fourth, they have arranged associations between research academies and institutes and higher institutions on the one hand and industrial enterprises within the Tiexi area on the other. Fifth, facing up to key technologies for the transformation of the Tiexi area, they will servethe whole country in holding bidding and in organizing key problem solving. Sixth, developing new technologies and developing rising new industries will increase the reserves for enterprises.

Currently, the conducting of experiments regarding the "science and technology construction areas" of Shenyang is actively being organized and carried out. Several meetings have been called in the city to study and discuss the planning methods and to formulate Tiexi science and technology planning for the seventh 5-year plan, which requires that more than 110 middle-size to large enterprises in the Tiexi area come up with planning for their own enterprises in the near future in which they will propose particular problem solving projects. At the end of October, they plan also to sift through and select major science and technology bidding projects so that when they have obtained bids from throughout the country, they can arrange for problem solving.

12586

CSO: 4008/2019

NATIONAL DEVELOPMENTS

S&T RESTRUCTURING EFFECTS IN ZHEJIANG DESCRIBED

Hangzhou ZHEJIANG RIBAO in Chinese 30 Oct 86 p 3

[Text] The restructuring of the science and technology system in this province has hastened the development of science research achievements and has prompted science research units to serve economic construction. This was said yesterday by the City Science and Technology Commission Director, Chen Chuanqun [7115 0278 5028], in a report to the standing committee of the provincial people's congress.

Chen Chuanqun concentrated in this report on the three aspects that were the restructuring of the science and technology allocation system, the opening up of technology markets, and the implementation of "spark plans." He said that since July 1984 about 45 percent of industrial research and development units have changed from a system where the state allocates operating expenses to a technology contract system. At the same time, these units have also restructured their methods of managing science research funds and the problem of responsible management of science research operating expenses. This reform has gradually strengthened the capacity for self-development of research units, and the enthusiasm of scientists and technicians has also been better motivated. At the same time as they actively take on research topics and speed up the research process, many scientists and technicians are leaving the institutes for technical service at base levels and at enterprises, which not only has accelerated the development of production, but the economic results of these science research units are quite outstanding.

Chen Chuanqun said that opening up the technology markets in this province was done rather early, and in the last 2 or 3 years they have greatly developed, going from county fair types of transactions to a regular type of transaction. There have appeared some 500-600 technology development, consulting, and service organizations. Lateral associations between science research and production are also developing more broadly and more deeply, are now developing from the bipartisan to the multilateral, from the transfer of rights to a single technology to the transfer of rights to whole sets of technologies, from technologies to associations for production and marketing, and from the basic levels to higher level associations. The commercialization of technical achievements and the opening up of technology markets is playing an ever more important role in the development of this province's science and technology and of its economy.

Chen Chuanqun said that the goal of the "spark plans" is to send advanced suitable technology into the countryside, to small enterprises, and to town and township enterprises. This will lead to these enterprises gradually getting onto the track of what is small scale, specialized, and modern, which will stimulate the development of the local economy. Each city, prefecture, and a large portion of counties in this province have proceeded from their own reality to formulate "spark plans" and to constitute hierarchical technology development that is of different scales. This year, there have been 157 "spark plan" projects that have been implemented throughout the province at the 3 levels that are the national, provincial, and city (prefectural), and funds invested have amounted to nearly 132 million yuan. At present, the development of many projects has been rather quick, some of which have already gained rather good results.

Chen Chuanqun said that each level of the people's governments in this province, pertinent departments, and scientific and technical circles are actively carrying out the "Resolution by the Central Committee Regarding Restructuring of the Science and Technology System," and have done a great deal toward this, and speaking from a view of the overall conditions, the directions for the reforms are correct and the progress is healthy. This has quickened the development of science research achievements and gone a step further in promoting the orienting to economic construction of science research units. But in this process of reform, there have also been many difficulties and problems, for example, corresponding policies and rules and regulations have not been complete, the restructuring of the science and technology system has not been linked to nor coordinated with finances, tax income, personnel matters, and even to the reform of the entire economic system. In this regard, it is hoped that attention will be paid at every level of government and by departments of science and technology, etc. If good efforts are made, these problems will eventually be resolved.

12586

CSO: 4008/2019

PHYSICAL SCIENCES

ANALYSIS OF ADHESIVE LAP JOINT

Chongqing YINGYONG SHUXUE HE LIXUE [APPLIED MATHEMATICS AND MECHANICS]
in Chinese Vol 7 No 10, Oct 86 pp 877-885

[English abstract of article by Zhang Fufan [1728 4395 5400] of Qinghua
University, Beijing]

[Text] This paper discusses the interlaminar stresses of adhesive lap joints
using the energy method without considering the adhesive layer. The joint is
made of two identical narrow plates. Two cases are discussed: one is for
isotropic material and the other is for orthotropic material. Due to the
difference in material forming the joint, the length of distribution and the
magnitude of the interlaminar stresses for the two cases will be very different.
(Paper received 29 Aug 85.)

REFERENCES

- [1] 张福范, 叠层复合材料拉杆的夹层应力, 复合材料学报, 1,1 (1984).
- [2] Goland, M. and E. Reissner, Stresses in cemented joint, *Journal of Applied Mechanics, ASME*, 11 (1944).
- [3] Yuceoglu, Umur and P. Updike, Bending and shear deformation effects in lap joints, *Journal of the Engineering Mechanics Division, ASCE*, 107 (1981).

CSO: 4009/1059

PHYSICAL SCIENCES

ON SURFACE INSTABILITY OF ELASTIC HALF SPACES

Chongqing YINGYONG SHUXUE [APPLIED MATHEMATICS AND MECHANICS]
in Chinese Vol 7 No 10, Oct 86 pp 937-945

[English abstract of article by Cao Guangzhong [2580 0342 0022] of the East
China Institute of Technology, Nanjing]

[Text] In this paper the author presents work on the surface instability of elastic half spaces. An analysis of the surface instability of an incompressible half space under biaxial loading is summarized, and the critical condition for the onset of surface buckling is given. As an example of compressible materials, the axisymmetric problem of surface instability for a half space made of a standard material is analyzed and the dependence of buckling parameters on the material is revealed. (Paper received 13 Mar 85.)

REFERENCES

- [1] Brunelle, E. J., Surface instability due to initial compressive stress, *Bulletin of the Seismological Society of America*, 63, 6 (1973), 1885—1893.
- [2] Biot, M. A., *Mechanics of Incremental Deformations*, Wiley (1965).
- [3] Novozhilov, V. V., *Nonlinear Theory of Elasticity*, Graylock (1953).
- [4] Dorris, J. F. and S. Nemat-Nasser, Instability of a layer on a half space. *J. Appl. Mech.*, 47 (1980), 304—312.
- [5] 曹光中, 不可压缩弹性半空间的表面不稳定性——轴对称问题的分析, 华东工程学院学报, 1 (1984), 1—13.
- [6] Wu, C. H. (吴建衡) and G. Z. Cao (曹光中), Buckling of an axially compressed incompressible half space, *J. Struct. Mech.*, 11, 1 (1983), 37—48.
- [7] 曹光中, 双向受载不可压缩弹性半无限体表面的稳定性, 固体力学学报 (待发表).
- [8] Wu C. H. and G. Z. Cao, Buckling problems in finite plane elasticity—harmonic materials, *Quart. Appl. Math.*, 41, 4 (1984), 461—474.
- [9] Sensenig, C. B., Instability of thick elastic solids, *Comm. Pure Appl. Math.*, 17 (1964), 451—491.
- [10] Wu, C. H., Plane-strain buckling of a crack in a harmonic solid subjected to crack-parallel compression, *J. Appl. Mech.*, 46 (1979), 597—604.
- [11] Wu, C. H., Plane-strain buckling of cracks in incompressible elastic solids, *J. Elast.*, 10, 2 (1980), 163—177.

APPLIED SCIENCES

PERTURBATION THEORY OF MULTIPLE STANDARD ADDITION METHOD IN ION-SELECTIVE ELECTRODE POTENTIOMETRY

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6,
20 Jun 86 pp 401-405

[English abstract of article by Wang Jirong [3769 1015 3579], et al., of the University of Science and Technology of China; Xu Aijuan [6079 1947 1227], et al., of Suzhou Teachers College]

[Text] A method is described for correcting the effect of the activity coefficient and liquid junction potential, etc., on E in the multiple standard addition method. It presents a new concept of the linear perturbation constant and a new algorithm for four-parameter fitting. In addition, a program is developed in which a set of data is computed on the IMS-8000 microcomputer experimentally. The results compare successfully with those of three-parameter fitting. (Paper received 25 Mar 85.)

REFERENCES

- (1) R.A.德斯特主编, 殷晋尧等译, 离子选择电极, 科学出版社, 1976年。
- (2) M.J.D.Brand and G.A.Rechnitz, *Anal.Chem.*, 42, 1172 (1970).
- (3) 赵藻藩等, 化学通报, (3), 21 (1981).
- (4) 蒲国刚, 张晓路, 中国科学技术大学学报, 13 (3), 314 (1983).
- (5) 王基铭等, 分析化学, 13 (5), 389 (1985).

APPLIED SCIENCES

CIAC-CARBON-13 NMR SEARCH SYSTEM

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6,
20 Jun 86 pp 431-435

[English abstract of article by Xu Lu [6079 4389], Li Guoquan [2621 0948
2938], et al., of Changchun Institute of Applied Chemistry, Chinese Academy
of Sciences]

[Text] Efforts have been made to develop a computer system for carbon-13
NMR spectra search. This system, called CIAC (Changchun Institute of Applied
Chemistry)-carbon-13 includes 11 modules with the following functions:
feature-selection searching, complete spectra matching, substructure
searching, chemical name searching, molecular formula, molecular weight
retrieval, etc. In addition, the CIAC includes a number of routines for
chemical shift calculation by empirical formulas and for the resolution of
overlapping peaks of carbon-13 NMR spectra; therefore, CIAC is powerful and
efficient for the structure interpretation of organic compounds. This system
handles about 12,000 compounds. It was written in FORTRAN and has been run
on a minicomputer PDP 11/23 under the RSX-11M operating system. (Paper
received 26 Aug 85.)

REFERENCES

- (1) S.R.Heller, et al., *Anal.chim.Acta*, **122**, 117(1980).
- (2) J.E.Dubois and J.C.Bonnet, *Anal.Chim.Acta*, **112**, 245(1979).
- (3) W.Bremser, H.wagner and B.Franke, *Org.Mag. Reson.*, **15**, 178(1981).
- (4) M.Zippel, J.Mowitz, I.Koler and H.J.Opferkuch, *Anal. chim.Acta*, **140**, 123(1982).
- (5) J.Zupan, M.Penca, M.Razinger and B.Barlic, *Anal. chim. Acta*, **122**, 103(1980).
- (6) V.Mlynarik, M.Vida and Vikello, *Anal.chim.Acta*, **122**, 27(1980).
- (7) 许禄, 李国权、王淑云、孙洁、张建国, “微计算机碳-13NMR 谱图库检索系统”, 计算机与应用化学, **2**(2), 111
(1985).

APPLIED SCIENCES

PREPARATION OF POLAR GLASS SUPPORT COATED OPEN TUBULAR COLUMNS

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6,
20 Jun 86 pp 405-409

[English abstract of article by Wang Guojun [3769 0948 0193], et al., of
Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences]

[Text] Polar SCOT columns of Superox-4, OV-275, FFAP and Dexsil-410 were prepared using the surface roughening technique and pretreatment before the coating process. The column efficiency, thermal stability and adsorption effect of polar analytes of the columns with different coating supports and liquid phases were investigated. The results show that the performance of these polar SCOT columns is satisfactory. (Paper received 15 Apr 85.)

REFERENCES

- (1) L.B!omberg, *HRC&CC*, 5, 520 (1982).
- (2) 孙和加, 林瑞芳, 第四次全国色谱学术报告会文集, 第145页, 1982年.
- (3) L. Blomberg, K. Markides and T. Wannman, "Proceedings of the Fourth International Symposium on Capillary Chromatography" edited by R. E.Kaiser, Published by Institute of Chromatography Bad Durkheim, P.73, 1981.
- (4) V.Pretorius and J.w. du Toit, *HRC&CC*, 4, 344 (1981).
- (5) 吕祖芳等, 多孔层玻璃毛细管色谱会议文集, 科学出版社, 1981年.
- (6) M.Verzele, G.Redant, M.Van Roelenbosch, M. Godefroot, M. Verstappe and P.Sandra., 同(3), P 239.
- (7) K.Grob Jr., G.Grob, K.Grob, *J. Chromatogr.*, 156, 1-20(1978).

DETERMINATION OF TRACE CYANIDE IN WATER BY FIBER OPTICS FLUOROMETRY

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6,
20 Jun 86 pp 415-418

[English abstract of article by Zhang Zhujun [4545 4554 0689], et al., of
the Department of Chemistry, Shaanxi Normal University]

[Text] A sensitive method for determination of trace cyanide is presented with ascorbic acid in a calcein- Cu^{2+} - CN^- system. The fiber optics fluorometer used was designed by the authors. The detection limit is 0.2 ppb. This method has been used for the determination of cyanide in underground water, river water and waste water. (Paper received 27 Apr 85.)

REFERENCES

- (1) D.E.Ryan and J.Holzbecher, *Intern.J. Environ. Anal.Chem.*, 1, 159 (1971).
- (2) 环境污染分析方法编写组, 环境污染分析方法, 第152页, 科学出版社, 1980年.

APPLIED SCIENCES

DETERMINATION OF MICRO AMOUNTS OF GOLD (III) BY CATHODIC STRIPPING VOLTAMMETRY

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6, 20 Jun 86 pp 464-466

[English abstract of article by Zhang Chunxu [1728 2504 3563], et al., of the Department of Chemistry, Nankai University]

[Text] A sensitive and simple method is suggested for the determination of the ppb level of Au(III) by cathodic stripping voltammetry. The graphite electrode prepared was soaked with paraffin plus polyethylene. Preconcentration of Au(III) in the test solution containing 0.1-2.0M of hydrochloric acid was carried out at +0.9V (vs SCE) for only 3 min without removing dissolved oxygen, thereby allowing the cathodic stripping curve to be recorded with a constant scanning rate of from +0.9 to 0.0 V potential. Cathodic current peaks appeared at +0.3 V potential and were directly proportional to the concentration of Au(III) over the range of 1-500 ppb levels. The influence of some ions on the reduction current of the Au(III) has been tested, and the determination results in mineral samples are given. (Paper received 11 Feb 85.)

REFERENCES

- [1] K.Z.Brainina, *Talanta*, 18, 513(1971).
- [2] 张玉祥等, 第三届全国分析化学年会文集, 第365页, 1983年。
- [3] 岩石矿物分析编写小组, 岩石矿物分析, 第624页, 地质出版社, 1974年。
- [4] 马光正等, 分析试验室, 4 (2), 29(1985).

APPLIED SCIENCES

KINETIC SPECTROPHOTOMETRIC DETERMINATION OF MANGANESE (II) IN POLLUTED WATERS

Changchun FENXI HUAXUE [ANALYTICAL CHEMISTRY] in Chinese Vol 14 No 6,
20 Jun 86 pp 467-468

[English abstract of article by Wang Zunben [3769 1415 2609], et al., of
the Chemical Department, Xiamen University]

[Tex] A kinetic spectrophotometric method is described for the microdetermination of Mn(II) in polluted waters based on its catalytic effect on the periodate-phosphinate reaction. After a fixed reaction time, the surplus amount of periodate is inversely proportional to the concentration of Mn(II). Nitrilotriacetic acid (NTA) can enhance the catalytic effect of Mn(II) on the reaction. The linear range obtained is from 0.2 to 9.0 ppb. Among 20 elements tested, only Co(II) interfered with the determination. The measurement for a single run takes 9 min. (Paper received 19 Feb 85.)

REFERENCES

[1] D.P.Nikolelis, *Analyst*, 102, 591(1977).
[2] 郑朱梓、王尊本, 分析化学, 13(7), 510(1985).

9717
CSO: 4009/1047

APPLIED SCIENCES

NONELECTROLYTE VAPOR-LIQUID EQUILIBRIUM DATA BASE

Beijing HUAXUE TONGBAO [CHEMISTRY] in Chinese No 6, 18 Jun 86 pp 46-50

[Article by Wang Luoshan [3769 2867 3790], Wen Hao [3306 3185], and Xu Zhihong [6079 1807 1347], Chemical Metallurgy Institute, Chinese Academy of Sciences]

[Abstract] The nonelectrolytic vapor-liquid data base, NEDB for short, is another chemical engineering data base at the authors' institute, which follows the inauguration of the inorganic thermochemistry data base. In 1980, the institute began compiling the related software; following more than 4 years of testing and evaluation, the software was gradually perfected with numerous computations on practical examples. The software of the data base is implemented in FORTRAN, executed on the Chinese-made TQ-16 and the VAX-11/780 computers. In 1982 began the migration of the software to the PDP-11/780 computer at the Chemical Engineering Design Institute, to the IBM-4341 computer at the Computer Center of the Ministry of Chemical Industry, and to the PRIME-550 computer at the Petrochemical Research Institute of the Ministry of Petroleum Industry. The NEDB includes 750 basic organic compounds, more than 20,000 items of basic physical property data, and about 190,000 phase-equilibrium data. The program system is modular in structure, allowing multiple input/output modes. Storage space can be saved by using characteristic words for compaction. Five examples are used in explaining the software. Three figures show the general structure of the NEDB and diagrams of component versus activity (and versus temperature) of the cyclopentane-benzene binary system.

REFERENCES

1. ITDB ZHUANKAN [SPECIAL ISSUE OF ITDB], published by the Chemical Metallurgy Institute, 1981.
2. Yan Zhenyi [7051 2182 1837], et al., HUAGONG YEJIN [CHEMICAL METALLURGY], Vol 77, No 1, 1983.
3. NEDB ZHUANKAN [SPECIAL ISSUE OF NEDB], published by the Chemical Metallurgy Institute, 1984.

10424/6091
CSO: 4009/1012

APPLIED SCIENCES

SYNTHESIS OF RARE EARTH-IRON-COBALT QUATERNARY OXIDES, THEIR THERMOSENSITIVITY

Chongqing YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS] in Chinese Vol 16 No 6, Dec 85 pp 313-316

[Article by Li Zhuotang [2621 0587 2768], Changchun Institute of Applied Chemistry, Chinese Academy of Sciences]

[Abstract] With the example of solid-phase reactions, the paper reports the synthesis of a series of 14 individual $RFe_xCo_{1-x}O_3$ ($R = La, Nd, Gd, Er$; $0.8 \geq x \geq 0.5$) compounds, of the orthogonal (axes) crystal type. Their cell parameters are given: $a = 5.239$ to 5.523 ; $b = 5.440$ to 5.572 ; and $c = 7.542$ to 7.820 . As found experimentally, the cell parameters of these compounds vary systematically with variations in the rare-earth elements and their x values. The paper considers the thermosensitivity of the above-mentioned materials and the mutual relationship between components and composition of these materials in discovering their regularities. Thus, this approach can demonstrate the feasibility of purposefully designing thermosensitive resistance materials with desired parameters. The material constants (B) of these materials range between 5.71 to 10.36×10^{30} K, and the effective temperature range is 150 to $700^\circ C$. Four tables list the cell parameters, B values, deflection temperatures, and the range of temperature measurement for the $RFe_xCo_{1-x}O_3$ thermosensitive components. Four figures show the resistance-temperature characteristics of La (Nd, Gd, and Er) $Fe_xCo_{1-x}O_3$ thermosensitive components.

REFERENCES

1. Dong Shaojun [5516 4801 0193], et al., XIYOU JINSHU [RARE METALS], Vol 3 No 35, 1981.
2. Tang Gongben [0781 0501 2609], et al., XITU [RARE EARTH ELEMENTS], Vol 3 No 38, 1982.
3. Ren Yufang [0117 3768 5364], et al., Ibid., Vol 1 No 1, 1984.
4. A. Wold and W. Croft, J. PHYS. CHEM., Vol 63, 1959, p 477.
5. M. Marezio, J.P. Remeika, and P.D. Dernier, ACTA CRYSTALLOGR, Vol B26, 1970, p 2008.
6. M. Eibschuetz, Ibid., Vol 19, 1965, p 337.

APPLIED SCIENCES

ELECTRIC PROPERTIES OF InP, $In_{1-x}Ga_xAs_yP_{1-y}$

Chongqing YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS] in Chinese Vol 16 No 6, Dec 85 pp 326-330

[Article by Meng Xianzhang [1322 2009 4545] and Yao Xin [1202 2946], Department of Electronics, Jilin University]

[Abstract] Within the 77-400°K range, the paper reports on measurements of the electronic Hall transfer rates for the group III to group V alloys InP and $In_{1-x}Ga_xAs_yP_{1-y}$. Using the theoretical formulas for the transfer rates, the authors match the experimental data with the least-squares method. Since it predominates in the two above-mentioned materials, the scattering mechanism is analyzed, thereby determining the material parameters, such as total impurity density; this yields a basis for improving the quality of the extension layer and for designing the required apparatus. For the samples InP and $In_{1-x}Ga_xAs_yP_{1-y}$ used in the experiments, the Hall coefficient and conductivity were measured using the Van der Paux method and an 0.252-T magnetic field. The sample electrode was made from an In-Sn alloy or else that served as the ohmic contact. Four figures show the curves of the Hall transfer rate varying with the temperature of the InP and InGaAsP electrons. Four tables list the calculated parameters for different materials, and the calculated property values of InP and InGaAsP. The authors are grateful to the following colleagues-- Yang Hui [2799 1979], Su Qingfen [5685 1987 5358], Yang Kefei [2799 0344 7236], Cui Dawei [1508 1129 1550], and Feng Hua [7458 5478]--for taking part in some of the experimental work and to Wang Jing [3769 4552] and Jia Anwei [6328 1489 0251] for furnishing samples.

REFERENCES

1. P. Blood and J.W. Orton, J. PHYS. C: SOLID ST. PHYS., Vol 7, 1974, p 483.
2. M.A. Littlejohn, R.A. Sadler, T.H. Glisson, and J.R. Hauser, "Gallium Arsenide and Related Compounds 1978," Conf. Ser. No 45, Institute of Physics, Bristol, 1979, p 239.
3. R.F. Leheny, A.A. Ballman, J.C. Dewinter, R.E. Nahory, and M.A. Pollack, J. ELECTRON. MATER., Vol 9 No 3, 1980, p 561.
4. P.K. Bhattacharya, J.W. Ku, S.J.T. Owen, G.H. Olsen, and S.H. Chiao, IEEE J. QUANTUM ELECTRON., QE-17, Vol 2, 1981, p 150.

5. B. Houston, J.B. Restorff, R.F. Allgaier, and J.R. Burke, SOLID-STATE ELECTRON., Vol 21, 1978, p 91.
6. P.D. Greene, S.A. Wheeler, A.R. Adams, A.N. El-Sabbahy, and C.N. Ahmad, APPL. PHYS. LETT., Vol 35 No 1, 1979, p 78.
7. Y. Taketa, M.A. Littlejohn, J.A. Hutchby, and R.J. Trew, ELECTRON. LETT., Vol 17 No 19, 1981, p 686.
8. J.R. Hayes, A.R. Adams, and P.D. Greene, "Low-Field Carrier Mobility, GaInAsP Alloy Semiconductors," ed. by T.P. Pearsall (John Wiley & Sons, 1982), p 189.
9. A. Fortini, J. APPL. PHYS., Vol 41 No 7, 1970, p 3121.
10. D.L. Rode, PHYS. REV., Vol B3, 1971, p 3287.
11. B.R. Nag and G.M. Dutta, J. PHYS. C:SOLID ST PHYS., Vol 11, 1978, p 119.

10424/9365
CSO: 4009/1009

APPLIED SCIENCES

DEVELOPMENT OF COVAR STRIP COLD-CLAD WITH Ag-Cu WELDING FILLER METAL

Chongqing YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS] in Chinese Vol 16 No 6, Dec 85 pp 340-344

[Article by Tao Zhigang [7118 1807 0474], Beijing Institute of Metallurgy]

[Abstract] Covar alloy clad with Ag-Cu welding filler metal is a composite material for electrical and vacuum applications. This cover alloy is composed of 4J29 covar metal and Ag72Cu28 welding filler metal. The cold compression binding method is used to blend these two alloys with a specific depth overlap to make thin bands. This composite material has the features of FJ29 covar alloy and Ag72Cu28 alloy welding filler, an ideal sealing material used for transistors. The composite material is applied mainly in shell and structural materials for field-effect transistors, mixer tubes, and low-power tubes. The paper presents the main features of 4J29 covar metal and Ag-Cu welding filler as well as selected fabrication techniques; in addition, the mechanical properties, punching elongation, and crystal grain size of different annealing systems of the composite material are described. Five tables list the linear expansion coefficients, metallographic texture, crystal grain size and other properties of the 4J29 alloy, and mechanical properties of covar alloy with Ag-Cu welding filler under different annealing conditions. Six figures show the interatomic-energy state of the metal, electron-microscopic views of boundaries before and after diffusion annealing, extrusion arrangement for making composite material, and mechanical properties and recrystallization of covar alloy with AgCu welding filler at different annealing temperatures.

REFERENCES

1. PENGZHANG HEJIN SHOUCE [HANDBOOK OF EXPANSION ALLOYS], Writing Team of PENGZHANG HEJIN SHOUCE, October 1979, Metallurgy Industry Publishing House.
2. Zhang Shuhong [1728 2579 4767], GUIJINSHU JIQI ZAI DIANZI GONGYE ZHONGDI YINGYONG [PRECIOUS METALS AND THEIR APPLICATIONS IN THE ELECTRONICS INDUSTRY], Series on Electronic Materials, May 1983.

10424/9365
CSO: 4009/1009

APPLIED SCIENCES

CHROMATE SPINELS: A HUMIDITY-SENSITIVE CERAMIC MATERIAL

Chongqing YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS] in Chinese Vol 16 No 6, Dec 85 pp 345-351

[Article by Yu Shuchang [0151 2885 2490] and Sun Daqian [1327 1129 0578], Huazhong Engineering College]

[Abstract] The paper describes the use of X-ray diffraction, scanning electron microscopy, and thermal analysis equipment to analyze solid-phase reactions, phase composition, and gas microbubble structures in $MgCr_2O_4-SnO_2$ and $ZnCr_2O_4-SnO_2$ systems. In addition, the paper discusses the mutual relationship among key technical factors, the gas bubble structure, and the humidity versus resistance property. Using the method of blending the Sb^{5+} donor impurity, the humidity-resistance property of the system can be enhanced in preparing specimens with appropriate variability of resistance and satisfactory linearity. Three tables list data on the gravimetric compositions of the chemical raw materials, phase analysis of post-clinkering MC and ZC series materials, and effects due to blended impurities on the lattice constants of $ZnCr_2O_4$ and SnO_2 . Twelve figures show a thermal spectrogram of ZC-2, scanning electron microscopy photographs of MC-1, ZC-1, ZC-2, and ZC-3, resistivity of $ZnCr_2O_4-SnO_2$ in a vacuum, the humidity versus resistance property curve, the humidity versus temperature coefficients of ZC-1, the mutual relationship of resistance versus temperature for $ZnCr_2O_4-SnO_2$ in a vacuum with Sb_2O_3 , the capillary adsorption effect, the curve of resistance versus time, and the effect of thermal scouring on the humidity versus resistance property curve. The authors are grateful to Liang Xipei [2733 6932 3099] of the Beijing Air Conditioning Station, Chen Shiqing [7115 1395 3237] of the Jiangsu Radio Research Institute, and Zhang Pinguang [1728 0756 0342] of the Chengdu Instrument Plant for assistance.

REFERENCES

1. Nita Tsuneharu [2450 3944 1854 3112], National Technical Report, Vol 24, 1978, p 422.
2. Harada [0626 3944], et al., Electronics Communication Society, CPM82-42 (1982).
3. Akiba [4428 5509], Ceramics Industry Association, Materials of Sensor Research Association, 1982.

4. Kame Yoshiharu [1420 1496 5030 3112], et al., TECHNICAL BULLETIN ON MITSUBISHI ELECTRICAL MACHINERY, Vol 56 No 2, 1982.
5. T. Nitta and Z. Terada, IEEE. TRANS. ELECTRON DEVICES ED-29, Vol 1, 1982, p 95.
6. Lu Zhengchang [7120 2973 9480], et al., YIBIAO CAILIAO [MATERIALS FOR INSTRUMENTS AND METALS], Vol 14 No 1, 1983, p 28.
7. Chen Shiqing [7115 1395 3237], ZHUANGANQI JISHU [SENSOR TECHNOLOGY], No 3, 1983.
8. P.D. Ownby and G.E. Jungquist, JOURNAL OF THE AMERICAN CERAMIC SOCIETY, Vol 55 No 9, 1972, p 433.
9. H.C. Graham, Ibid., Vol 54 No 2, 1971, p 89.
10. Okume Hideo [1129 3574 5391 1133] et al., ELECTRONIC MATERIALS, Vol 16 No 2, 1977.
11. Mo Yihao [5459 0110 6275], Li Biaorong [2621 2871 2837], and Zhou Guoliang [0719 0948 5328], BANDAOTI TAOCI JIQI MINGAN YUANJIAN [SEMICONDUCTOR CERAMICS AND SENSING COMPONENTS], Shanghai Science and Technology Publishing House, 1982 Edition, p 289.

10424/9365
CSO: 4009/1009

APPLIED SCIENCES

DOUBLE-SHIELDED ASPIRATED THERMOCOUPLE SENSOR

Chongqing YIBIAO CAILIAO [JOURNAL OF INSTRUMENT MATERIALS] in Chinese Vol 16 No 6, Dec 85 pp 352-354

[Article by Zhang Zhongting [1728 0022 0080], Institute No 606]

[Abstract] The temperature of gas flows is a vital parameter in engine operation. When measuring the temperature of a high-rate, high-temperature gas flow, one can determine the overall temperature of the gas flow by calibrating the indicated temperature with allowance for the thermal radiation and conduction losses occurring in the temperature-measuring components. The paper describes a double-shielded aspirated thermocouple sensor with unique advantages--very small losses in thermal radiation and conduction that are negligible in practical cases. The overall temperature recovery coefficient is a constant, unrelated to the gas flow rate. This sensor can be used as a reference standard in measuring the overall temperature of a flowing gas during a calibration experiment of determining thermocouple radiation; this sensor has been used often during aircraft engine tests. Refer to NACA TN 3766 for the design of the aspirated thermocouple and tests on its overall temperature recovery property. The test conditions are as follows: Mach number for gas flow: $M = 0.2$ to 0.6 ; static pressure: 1 atm. Test results can be used to find (among others) the constant, overall temperature recovery coefficient of a particular structure. One table shows the effect of the Mach number. Two figures show a double-shielded aspirated thermocouple sensor and the effect on the overall temperature recovery coefficient due to the gas suction rate.

REFERENCES

1. NACA TN 3766.
2. NASA TP 1099.
3. NASA CR 72453.
4. WENDU CELIANG [TEMPERATURE MEASUREMENT], materials from the Red Flag Machinery Plant.

10424/9365
CSO: 4009/1009

APPLIED SCIENCES

SYNTHESIS OF ORGANIC TITANIUM COMPOUNDS

Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCE EDITION)] in Chinese Vol 22, No 2, 28 Jun 86 pp 102-103

[Article by Ma Yongyang [7456 3057 3152] and Hou Xue [0186 4494]]

[Abstract] Starting with dichlorodiamyl titanium, the authors report on their synthesis of alkoxide and acyloxide diamyltitanium compounds (previously not reported in the literature): dicyclo-[2,2,1]-heptyl-5-alkene-2-methoxy-chlorodiamyl-titanium (I), di-(dicyclo-[2,2,1]-heptyl-5-alkene-2-methoxy)-diamyl-titanium (II), and dicyclo-[2,2,1]-heptyl-5-alkene-2-methylacyl-oxide-chlorodiamyl-titanium (III). Table 1 of the paper shows the compound analysis and elemental analysis.

(1) 化合物	(2) 结构式	(3) 颜色	(4) 收率 %	(5) 元素 分析 %
				C H Cl
I	$Cp_2Ti(OCH_2-\text{C}_6\text{H}_4-\text{C}_2\text{H}_4)Cl$	(6) 桔黄色 (6) 结晶	62	(8) 测定 63.45 6.53 10.24 (9) 计算 64.20 6.29 10.53
II	$Cp_2Ti(OCH_2-\text{C}_6\text{H}_4-\text{C}_2\text{H}_4)_2$	红色粘 (7) 稠液体	59	(8) 测定 73.16 7.70 (9) 计算 73.58 7.60
III	$Cp_2Ti(O_2C-\text{C}_6\text{H}_4-\text{C}_2\text{H}_4)Cl$	桔黄色 (6) 结晶	50	(8) 测定 60.83 5.72 10.10 (9) 计算 61.64 5.46 10.11

*Cp is cycloamyl-dialkene radical.

Key:

1. Compound	6. Orange-yellow crystals
2. Structural formula	7. Red sticky liquid
3. Color	8. Measured values
4. Recovery rate	9. Calculated values
5. Elemental analysis	

Compounds I and II are extremely active, dissolving at once when in contact with water or air; if kept in dry inert gas, I and II can be preserved for several days. Compound III is relatively stable and can be kept for a longer

time in inert gas. All the reported compounds dissolve readily in benzene, either, tetrachlorofuran, and some other organic solvents, but are not soluble in normal hexane and petroleum ether. Table 2 shows the property absorption spectrum of these diamyl-titanium derivatives.

(1) 化合物	(2) 特、征、吸、收、峰、cm ⁻¹									
I	3093 _m	3058 _w	2952 _s	2861 _s	1637 _w	1441 _m	1342 _m	1075 _s		
	1011 _m	807 _s	730 _{ms}	674 _{ms}	633 _{ms}	590 _m	448 _w			
II	3120 _m	3070 _w	2960 _s	2870 _m	1650 _w	1454 _s	1340 _{ms}	1087 _{ms}		
	1030 _s	810 _m	715 _w	640 _w	592 _w	450 _w				
III	3125 _w	3059 _s	2967 _m	2869 _{ms}	1718 _m	1632 _s	1420 _m	1337 _m		
	1283 _m	1250 _m	1020 _m	814 _s	716 _m	588 _w	486 _w			

Key:

1. Compound
2. Property absorption peak

The authors are grateful to Ma Zhaoli [7459 2507 4409] of the Department of Infrared Spectrum Determination.

REFERENCES

1. H. Kopf, M. Schmidt, ANGEW. CHEM., Vol 77, No 21, 1965, p 965.
2. K. Andra, J. ORGANOMET. CHEM., Vol 11, No 3, 1968, p 567.
3. Chen Shoushan [7115 1108 1472], et al., ZHONGGUO KEXUE [SCIENCE IN CHINA], Vol 10, 1981, p 1225.
4. Wu Shaozu [0702 4801 4371], et al., LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN), Vol 18, No 3, 1982, p 57.
5. V.V. Korshak, et al., VYSOKOMOLEKUL SOYEDIN [HIGH MOLECULAR COMPOUNDS], Vol 5, No 9, 1963, p 1284.

10424/6091
CSO: 4009/1019

APPLIED SCIENCES

COMPUTER PROCESSING OF GEL PERMEATION CHROMATOGRAPHY DATA

Shanghai HUAXUE SHIJIE [CHEMICAL WORLD] in Chinese Vol 27, No 9, 25 Sep 86
pp 408-412

[Article by Hua Lei [5363 5628] and Tao Huifen [7118 1920 5358], Research Institute of Organofluorine Materials, Shanghai Municipality]

[Abstract] Processing data from gel permeation chromatography [GPC] is complicated, often demanding large outlays in time and labor by the test personnel. The authors wrote a program in BASIC to process the GPC data. After execution, the printout shows the average number of molecules \bar{M}_n , average molecular weight \bar{M}_w , and the index of the distribution width of the molecular weight \bar{M}_2/\bar{M}_n . Also on the printout are cumulative and differential distributions of molecular weight. The second program compiled by the authors can assist test personnel to select rationally the number N of equal divisions of the GPC spectrogram. The paper lists nine equations for writing program 1 and three additional equations for program 2. These programs were tested on APPLE computers; satisfactory results were also obtained on the EG 3200 and ALTOS 986 computers. One figure shows a GPC spectrogram. Two tables show the data processing results and comparison results.

REFERENCES

1. Compiled by Shi Lianghe [2457 5328 0735], NINGJIAO SEPUFA [GPC SPECTROGRAM], Science Publishing House, 1980.
2. Tao Huifen, SEPU [CHROMATOGRAM], Vol 3, No 45, 1985.

10424/6091
CSO: 4009/1022

APPLIED SCIENCES

COMPUTER ANALYSIS OF ELECTRONYSTAGMOGRAM SIGNALS, ITS CLINICAL APPLICATIONS

Beijing ZHONGHUA ERBIYANHOUKE ZAZHI [CHINESE JOURNAL OF OTORHINOLARYNGOLOGY] in Chinese Vol 21, No 2, 10 Jun 86 pp 138-140

[Article by Xu Shihui [6079 2514 2547], Wang Huajuan [3769 5478 1227], Zhang Huihua [1728 1979 5478], Wu Xiaoping [0702 2556 1627], Li Jixiao [2621 4949 1321], and Yin Huizhu [1438 1920 3796], Otorhinolaryngology Ward, First Shanghai Municipal People's Hospital; and Guo Zhaowu [6753 2507 2976], Shen Xing [1957 5887], and Nie Chunni [5119 2504 1200], Shanghai Institute of Computer Technology]

[Abstract] The paper reports on the use of the Chinese-made model 056-B microcomputer for processing signals of electronystagmograms for local discrimination of nystagmic waves by using the recorded characteristic value of the graphical wave type. On this basis, parameters are computed. This approach is simple, rapid, and accurate in operation for on-line, real-time processing of common clinical tests. Once the test is concluded, an immediate printout of the required parameters is available. After digital filtration processing, the (formerly) recorded real graph can reappear. Electronystagmogram examinations were conducted on 50 healthy persons and 60 cases of patients complaining of dizziness; the outcome is thus much more accurate than by manual discrimination. One figure shows a sketch diagram of the test and processing system. Four tables list the following measured value: slow-phase angular velocities of apparent-mobility nystagmus and varying-temperature tests, varying-temperature test frequency, and sensitivity difference for the two ears. The first draft was received on 18 July 1984; the final, revised draft was received for publication on 1 April 1986.

REFERENCES

1. M. Cheng, et al., "Frequency Content of Nystagmus," AEROSPACE MED, Vol 44, 1973, p 383.
2. R.W. Baloh, et al., "Algorithm for Analyses of Saccadic Eye Movements Using a Digital Computer," AVIAT SPACE ENVIRON MED, Vol 47, 1976, p 323.
3. A.W. Sills, et al., "Algorithm for the Multi-Parameter Analysis of Nystagmus Using a Digital Computer," AVIAT SPACE ENVIRON MED, Vol 46, 1975, p 934.

4. H.O. Barber, "Manual of Electronystagmography," Louis:Mosby, 1976, p 145.
5. Editing Committee of ZHONGHUA ERBIYANHOUKE ZAZHI, YANZHEN DIANTU [ELECTRONYSTAGMOGRAM], ZHONGHUA ERBIYANHOUKE ZAZHI, Vol 17, 1982, p 90.

10424/6091
CSO: 4009/1018

LIFE SCIENCES

STUDY ON MICROWAVE STERILIZATION MEDIUM

Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese Vol 13, No 4, Aug 86
pp 177-179, 184

[Article by Zhao Wenbin [6392 2429 1755], Gu Xiangyun [7357 4382 7189], Chen Qing [7115 3237], and Cheng Yufeng [4453 3768 7685], Lianyunjiang Municipal Sanitation and Quarantine Station; and Xu Jinkang [1776 6930 1660], Lianyunjiang Branch, Plant No 778, China Electronic Equipment General Corporation]

[Abstract] The paper reports on the use of microwaves in sterilizing sugar-containing and serum microbe culture media for which high-temperature or high-pressure steam is not applicable because different degrees of hydrolysis and denaturation occur at high temperatures. In this method, the use of microwave for a 20-minute exposure at 85°C can achieve the purpose of sterilizing the culture medium. The microwave oven used has an automatic temperature control device with a computer program. The procedure is simple with savings in electric power and good sterilization effect. Six tables show the microwave sterilization effects, sterilization effects with different temperatures and exposure times, and comparative biological results as between microwave and high pressure steam sterilization.

REFERENCES

1. Zhi Qixun [5347 1505 8113], SHIPIN GONGYE [FOOD INDUSTRY], Vol 18, No 4, 1975, p 94.
2. Zhang Kuanhou [1728 1401 0624], XIJUN SHENGLIXUE [PHYSIOLOGY OF BACTERIA], People's Sanitation Publishing House, 1964, p 240.
3. Ding Lanying [0002 5695 5391], et al., XIAODU YU MIEJUN [DETOXIFICATION AND STERILIZATION], Vol 1, No 2, 1984, p 82.
4. XIAODU SHACHONG MIESHU SHOUCE [HANDBOOK OF STERILIZATION AND ERADICATION OF INSECTS AND MICE], XIAODU SHACHONG MIESHU SHOUCE, People's Sanitation Publishing House, 1980, p 32.

10424/6091
CSO: 4009/3003

LIFE SCIENCES

SIMPLE PERIODATE METHOD FOR HORSERADISH-PEROXIDASE-LABELED STAPHYLOCOCCAL PROTEIN A

Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese Vol 13, No 4, Aug 86
pp 171-173

[Article by Zhou Huizhen [0719 1920 3791], Qiao Boying [0829 0130 5391], Wang Honghai [3769 0130 5391], and Zhang Xiaoping [1728 2556 1627], Immunology Laboratory, PLA General Hospital; and Gong Zhishu [7895 1807 5890], Military Medical School, Wuhan Military Region]

[Abstract] The periodate method is most often used to label staphylococcal protein A (SPA) with horseradish peroxidase (HRP). Following the method of HRP labeling of antibodies reported by Wilson, et al., the authors improved it in preparing the HRP-SPA binder. In China and elsewhere, there have been no similar reports on the use of the authors' method in preparing HRP-SPA. The authors apply dialysis to purify the binder, while in Wilson's original method the Sephadex S-200 tomography method was used. Thus, the authors' method is simpler and faster, so it is called the simple periodate method. Four tables show the comparison between these two methods and the comparative effects of binders obtained with different proportions of HRP and SPA and of labeling SPA using Chinese-made and Sigma (United States) HRP's, as well as a determination of serum HSV-1/IgG antibody of healthy persons employing the HRP-SPA immune enzyme method.

REFERENCES

1. M. Dubois-Daleq, et al., HISTOCHEM. CYTOCHEM., Vol 25, 1977, p 1201.
2. H.P. Medore, et al., J. CLIN. MICROBIL., Vol 10, 1979, p 529.
3. Xue Caifang [5641 6846 5364], et al., ZHONGHUA WEISHENGWUXUE HE MIANYIXUE ZAZHI [CHINA MICROBIOLOGY AND IMMUNOLOGY JOURNAL], Vol 2, 1982, p 124.
4. M.B. Wilson, et al., "Immunofluorescence and Related Staining Techniques," 1978, p 215.
5. Xue Caifang, et al., DISI JUNYI DAXUE XUEBAO [BULLETIN OF FOURTH MILITARY MEDICAL UNIVERSITY], Vol 2, 1980, p 131.
6. Xue Caifang, et al., ZHONGGUO MIANYIXUE ZAZHI [CHINA IMMUNOLOGY JOURNAL], Vol 1, No 1, 1985, p 43.

LIFE SCIENCES

MICROCHEMICAL METHOD FOR DETERMINING HEMAPORPHYRIN DERIVATIVES IN BLOOD

Beijing YAOXUE TONGBAO [CHINESE PHARMACEUTICAL BULLETIN] in Chinese Vol 27, No 7, 8 Jul 86 pp 400-402

[Article by Xiang Wenyu [0686 2429 3768] and Wang Jun [3769 3449], Drug Material Division, PLA General Hospital; Pan Yuming [3382 3768 2494] and Guo Zhonghe [6753 0022 0735], Physical Therapy Ward, PLA General Hospital; and Huang Ruheng [7806 1172 5899], Institute of Pharmacology and Toxicology, Military Academy of Medical Sciences]

[Abstract] A new technique for diagnosing and treating tumors is the use of laser and hemaporphyrin derivatives (HPD). To avoid a photosensitive reaction to HPD, it is often required to monitor the blood-drug level. The paper reports that 0.5 ml of physiological saline solution was added to dilute whole blood. After centrifuging for separation, the fluorescence method was applied for a determination. The method is satisfactory for clinical monitoring as it is simple, fast, and accurate with a high sensitivity. In this method, only micro-quantities of blood are used; thus the method is readily tolerated by the patient. The phenomenon of hemolysis can be reduced for greater precision in determinations. HPD is highly photosensitive; therefore, light should be excluded in the procedures from blood collection to titration. Two figures show a standard curve of No 3 photo-porphyrin and a variation in the blood-drug level after an intravenous injection into mice. Four tables show a comparison between whole-blood and serum methods, the HPD recovery rate, the fluorescence intensities of three kinds of HPD, and the effect of sunlight on HPD.

REFERENCES

1. Laser-HPD Research Team, Beijing Municipality, ZHONGHUA ZHONGLIU ZAZHI [CHINA ONCOLOGY JOURNAL], Vol 4, 1982, p 122.
2. Xiang Wenyu, et al., JIGUANG YIXUE [LASER MEDICINE], Vol 1, 1983, p 16.
3. Xiang Wenyu, et al., JIGUANG YIXUE, Vol 1, 1983, p 17.
4. J.J. Dougherty, et al., CANCER RES, Vol 38, 1978, p 2628.
5. I.J. Forbes, MED. J. AUST., Vol 2, 1980, p 489.

10424/6091
CSO: 4009/3001

LIFE SCIENCES

ERYTHROCYTE MEMBRANE PROTEIN, ATP ENZYME IN ONE CASE OF HEREDITARY HYPERCYTOSIS OF FUSIFORM CELLS

Tianjin ZHONGHUA XUEYEXUE ZAZHI [CHINESE JOURNAL OF HEMATOLOGY] in Chinese
Vol 7, No 7, 30 Jun 86 pp 349-350

[Abstract of article by Li Jianxin [2621 1696 2450], Wei Yaomei [7614 1031 2734], Jiang Guanxiang [1203 7070 4382], Wei Shanjian [7614 0810 1696], and Xu Wensheng [6079 2429 3932], Biochemistry Faculty Research Laboratory, Second Military Medical University; and Yan Yunkun [7051 6663 0981], Lu Yanqun [0712 7159 5028], and Liang Kaizhong [2733 7030 1813], First Hospital, Second Military Medical University]

[Text] The authors analyzed the composition of erythrocyte membrane protein and the reactivity of membrane ATP enzymes in one case of the hereditary hypercytosis of fusiform cells in exploring the link between cell transformation and its biochemical variability. The erythrocytes were centrifugally isolated to determine the density gradient; SDS-polypropene amide gel of the erythrocyte membrane protein underwent electrophoresis; and membrane Na^+-K^+ -ATP enzyme activity and Ca^{++} -ATP enzyme activity were compared as between healthy persons and patients. The deficiency of patients' erythrocyte membrane anchorage protein and the lower intracellular ATP level should be further studied to determine whether these phenomena induce cell transformation. The authors are grateful to Professor Xu Yue'e [6079 2588 1230] for her interest. The first draft was received on 16 July 1984; the final, revised draft was received for publication on 15 April 1985.

REFERENCES

1. Yan Yunkun, et al., "Study of Clinical and Experimental Studies of the Hereditary Hypercytosis of Fusiform Cells (With Lineage Investigation)," ZHONGHUA XUEYIXUE ZAZHI [CHINESE JOURNAL OF HEMATOLOGY], Vol 6, No 9, 1985, p 545.
2. Li Jianxin, et al., "Study of Na^+-K^+ ATP Enzyme of Human Erythrocyte Membrane," DI'ER JUNYI DAXUE XUEBAO [JOURNAL OF THE SECOND MILITARY MEDICAL UNIVERSITY], Vol 4, No 4, 1983, p 275.
3. Fairbanks, G., et al., "Electrophoretic Analysis of the Major Polypeptiaes of the Erythrocyte Membranes," BIOCHEMISTRY, Vol 10, 1971, p 2606.

LIFE SCIENCES

SPONTANEOUS SUPPRESSOR T CELL FUNCTION AND ITS RELATIONSHIP WITH T CELL SUBSETS IN HEPATITIS B

Beijing ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA] in Chinese
Vol 66 No 9, 15 Sep 86 pp 514-518

[English abstract of article by Liu Feng [0491 2800], et al., of Tongji Medical College Hospital]

[Text] Seventy-five patients with various types of hepatitis B were studied using an assay of Gattringer's spontaneous suppressor T cell (STs) function. Of those studied, 24 patients with chronic hepatitis B virus (HBV) infection were simultaneously investigated by enumeration of OKT₃⁺, OKT₄⁺ and OKT₈⁺ T cell subsets in peripheral blood with the SPA-Ig rosette forming technique.

Patients with chronic active hepatitis (CAH) had a significantly decreased STs function while nearly normal STs function was seen in patients with chronic persistent hepatitis (CPH). All but one asymptomatic HBsAg carrier had normal, or even higher than normal, STs function.

The OKT₈⁺ cell proportion was significantly higher than normal in all patients tested. The OKT₄/OKT₈ ratio was obviously low both in CAH and CPH. However, patients who were positive when tested for HBeAg had even lower OKT₄/OKT₈ ratios.

A positive correlation between STs function and the proportion of OKT₈⁺ cells was identified, while most patients with CAH showed a higher proportion of OKT₈⁺ cells and destroyed STs function simultaneously. It is proposed that in CAH the increased OKT₈⁺ cells include mostly cytotoxic T cells. (Paper received 27 Jan 86; revised 5 May 86.)

REFERENCES

1. Chisari FV, et al. Functional properties of lymphocyte subpopulations in hepatitis B virus infection. I. Suppressor cell control of T lymphocyte responsiveness. *J Immunol* 1981;126:38.
2. Krawitt EL, et al. Immune regulation and HLA types in chronic hepatitis. *Hepatology* 1981;1:300.
3. Alexander GJ. Contrasting relations between suppressorcell function and suppressor-cell number in chronic liver disease. *Lancet* 1983; 8337:1291.
4. Barnaba V, et al. Relationship between T cell subsets and suppressor cell activity in chronic hepatitis B virus (HBV) infection. *Clin Exp Immunol* 1983; 53:281.
5. 张定凤, 等. 乙型肝炎抑制性细胞功能初步研究. *中华内科杂志* 1983; 22:6.
6. Gattringer C, et al. Spontaneous and conA-Induced suppressor lymphocytes. a comparative study. *Immunobiology* 1981; 159:293.
7. 史良如. 杂交瘤技术——单克隆抗体的制造. 卫生部武汉生物制品所, 1984:28.
8. 李绍康, 等. 国产尼龙毛分离T-B淋巴细胞. *上海免疫学杂志* 1981; 1:10.
9. Thomas HC, et al. The immunopathology of autoimmune and hepatitis B virus-induced chronic hepatitis. *Semin Liver Dis* 1984; 4:36.
10. Mondelli M, et al. Specificity of T lymphocyte cytotoxicity to autologous hepatocytes in chronic hepatitis B virus infection: evidence that T cells are directed against HBV core antigen expressed on hepatocytes. *J Immunol* 1982; 129(6):2773.

LIFE SCIENCES

STUDY OF SUPPRESSOR T CELL FUNCTION AND T CELL AUTOLOGOUS HEPATOTOXICITY IN CAH-B

Beijing ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA] in Chinese
Vol 66 No 9, 15 Sep 86 pp 519-520

[English abstract of article by Xie Xianchun [6200 6343 1504], et al., of the Hepatitis Laboratory, Beijing Infectious Diseases Hospital No 2]

[Text] For further study of the pathogenesis of chronic active hepatitis B (CAH-B), tests which examine Ts cell function and T cell autologous hepatotoxicity were established. It was found that the Ts cell function was subnormal in 75.6 percent (49/64) of patients with CAH-B and the lymphocyte cytotoxicity to autologous hepatocytes was positive in 79.3 percent (69/87) of the patients. Thirty-two patients with positive lymphocyte cytotoxicity to autologous hepatocytes had their Ts cell function tested simultaneously in order to observe the relationship between Ts cell function and T and non-T cytotoxicity. Two patients with negative T cell mediated cytotoxicity were normal in Ts cell function (mean inhibition rate 49 percent). Of the other 30 patients with positive T cell mediated cytotoxicity, 26 showed impaired Ts cell function (mean inhibition rate 8.5 percent). The difference is significant ($P < 0.01$). In addition, 12 patients with negative non-T cell mediated cytotoxicity had a mean inhibition rate of 23.8 percent, while the 20 patients with positive non-T cell mediated cytotoxicity had a mean inhibition rate of -2.3 percent. This difference is also significant ($P < 0.05$). These results suggest that there is a correlation between the function of Ts cell and T and non-T cytotoxicity, and the HBV T and non-T cytotoxicity and abnormal function of the Ts cell may play an important role in the pathogenesis of CAH-B. (Paper received 5 Nov 85; revised 22 Apr 86.)

REFERENCES

1. Shou L, et al. Suppressor cell activity after Concanavahin A treatment of lymphocytes from normal donors. *J Exp Med* 1976; 143:1100.
2. 吉中和, 等. 病毒性肝炎患者抑制性细胞活性的研究. 中华医学杂志 1984; 64:230.
3. Eddleston ADWF, et al. Lymphocyte cytotoxicity to autologous hepatocytes in chronic hepatitis B virus infection. *Hepatology* 1982; 2:122s.
4. 谢贤春, 等. 病毒性肝炎病人淋巴细胞对自身肝细胞的细胞毒研究. 中华内科杂志 1985; 22 (增刊):25.
5. Nonomura A, et al. Disordered immunoregulatory functions in patients with chronic active hepatitis. *Clin Exp Immunol* 1982; 47:595.
6. Levy GA, Chisari FV. The immunopathogenesis of chronic HBV induced liver disease. Springer Semin Immunopathol 1981; 3:439.

STUDY OF INTRAHEPATIC VIRAL DNA IN 98 PATIENTS WITH VIRAL HEPATITIS B

Beijing ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA] in Chinese
Vol 66 No 9, 15 Sep 86 pp 521-524

[English abstract of article by Wen Yumei [5113 3768 2734], et al., of Shanghai Medical College]

[Text] HBV DNA status in the liver tissues of 98 patients with viral hepatitis B was studied. Among them, 7 were acute cases, 5 were severe cases, 58 were chronic active hepatitis and 20 were chronic persistent hepatitis. There were six cases histopathologically diagnosed as nonspecific chronic hepatitis and two cases as essentially normal. DNA was extracted from liver biopsies, souther blotted and hybridized to 32 P-labeled cloned HBV insert probes. In 57 serum HBeAg positive cases, HBV DNA was detected in 44 cases (77.19 percent) and in 38 HBeAg negative cases. Eighteen (47.36 percent) were HBV DNA positive. However, in the serum anti-HBe positive cases, 13/20 (65 percent) had HBV DNA in their liver tissues, and only 2 of them showed HBV DNA integration. Nine out of 98 cases showed HBV DNA integration in their liver tissues, and eight of these nine cases showed HBV DNA integration together with free and replicating forms. The serum HBV DNA positive percentage was lower in severe cases and chronic active hepatitis with liver cirrhosis, although the liver HBV DNA positive rate was almost the same as in other groups. The significance of these findings is discussed. (Paper received 14 Apr 86; revised 17 Jun 86.)

REFERENCES

1. Brechot C, et al. Detection of hepatitis B virus DNA in liver and serum: a direct appraisal of the chronic carrier state. *Lancet* 1981; 2:765.
2. Shafritz DA, et al. Integration of hepatitis B virus DNA into the genome of liver cells in chronic liver disease and hepatocellular carcinoma. *N Engl J Med* 1981; 305:1067.
3. Yokosuka O, et al. Active and inactive replication of hepatitis B virus deoxyribonucleic acid in chronic liver disease. *Gastroenterology* 1985; 89: 610.
4. 阎玉梅, 等. 乙型肝炎病毒 DNA 在患者血清及肝组织中存在状态的研究. 病毒学报 1985; 1:313.
5. Shafritz DA, et al. Molecular characterization of viral forms observed in persistent hepatitis infection, chronic liver diseases and hepatocellular carcinoma in woodchucks and humans. In: Vyas GN et al Eds. *Viral hepatitis and liver diseases*. New York: Grune 1984:225.
6. Thomas HC, et al. Immunologic mechanisms of cell lysis in hepatitis B virus infection. In: Vyas GN, et al eds. *Viral hepatitis and liver diseases*. Grune 1984:167.
7. Kam W, et al. Hepatitis B viral DNA in liver and serum of asymptomatic carriers. *Proc Natl Acad Sci USA* 1982; 79:7522.
8. Shafritz DA, et al. Presence of hepatitis B virus-deoxyribonucleic acid in human tissues under unexpected circumstances. *Gastroenterology* 1985; 89:687.
9. Yokosuka O, et al. Changes of hepatitis B virus DNA in liver and serum caused by recombinant leukocytes interferon treatment: analysis of intrahepatic replicative hepatitis B virus DNA. *Hepatology* 1985; 5:728.
10. Chu CM, et al. Natural history of chronic hepatitis B virus infection in Taiwan: Studies of hepatitis B virus DNA in serum. *Hepatology* 1985; 5:431.

ORAL ADMINISTRATION OF BRANCHED CHAIN AMINO ACID IN TREATMENT OF HEPATIC DISEASE

Beijing ZHONGHUA YIXUE ZAZHI [NATIONAL MEDICAL JOURNAL OF CHINA] in Chinese
Vol 66 No 9, 15 Sep 86 pp 525-527

[English abstract of article by Qian Shaocheng [6929 4801 6134], et al., of
Hedong Hospital, Tianjin]

[Text] Oral administration of branched chain amino acid powder (BCAAp) which contains L-valine, L-leucine and L-isoleucine was studied in the laboratory and as a clinical trial in the authors' unit for three years.

The results of laboratory study of 10 patients with liver cirrhosis orally given BCAAp are summarized as follows:

1. There was a significant elevation of plasma BCAA concentration.
2. The patients' abnormally high levels of plasma methionine, tyrosine, phenylalanine and free tryptophane were significantly decreased after treatment, and the effect lasted for more than six hours.
3. The patients' abnormally high levels of blood ammonia also showed a marked decrease one hour after taking BCAAp.

The results of the clinical trial demonstrated that 17 patients with chronic hepatic coma and 35 patients with chronic hepatitis showed marked improvement after taking BCAAp for two to three months. (Paper received 15 Dec 85; revised 5 May 86.)

REFERENCES

1. Fischer JE, et al. The effect of normalization of plasma amino acid on hepatic encephalopathy in man. *Surgery* 1976; 80:77.
2. 錢紹誠, 等. 肝衰竭和肝昏迷的血漿氨基酸變化及其治療. 中華醫學雜志 1984; 64:43.
3. 織田敏次, 岡博. 肝臓(機能と病態). 第1版. 東京: 中外医学社, 1982:49.
4. 後藤信昭, 他. 特殊組成アミノ酸輸液による肝硬変の肝性脳病に対する治療——特に血漿遊離アミノ酸と血中アンモニア及ぼす影響について. 肝臓 1983; 24: 530.
5. 橋本 修, 斎藤公志郎. 肝不全における分枝鎖アミノ酸代謝異常とその対策. 肝臓 1985; 26:1568.
6. Sieg A, et al. Branched-chain amino acid elemental diet in patients with cirrhosis of liver. A blind crossover trial. *Z Gastroenterol* 1983; 21:644.
7. 山田伸夫, 他. 慢性肝疾患, 主として肝硬変症に対する分枝鎖アミノ酸長期経口投与の臨床的意義. 肝臓 1985; 26:1570.

9717
CSO: 4009/1054

- END -